WAIANAE RESIDENCE LOTS - UNIT 2
HAWAIIAN HOME LANDS
PRELIMINARY SOIL REPORT

WAIANAE VALLEY, WAIANAE, OAHU, HAWAII
TAX MAP KEY: 8-5-04: 12, Por. 1 & 53

To:
MR. GEORGE KURIO

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

JANUARY 17, 1975

WALTER LUM ASSOCIATES, INC.
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January 17, 1975

MR. GEORGE KURIO
1300 Pali Highway, Room 208
Honolulu, Hawaii 96813

Dear Mr. Kurio:

Subject: Waianae Residence Lots - Unit 2
Hawaiian Home Lands
Preliminary Soil Report
(for site grading for residential development purposes)
Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

Transmitted herewith is our preliminary soil report for residential development for Waianae Residence Lots - Unit 2 at Waianae Valley, Waianae, Oahu, Hawaii.

This report includes a Boring Location Sketch, boring logs, laboratory test results, recommendations and limitations.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By Ezra Koike
Ezra Koike

SHL/EK:vl

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WAIANAE RESIDENCE LOTS - UNIT 2
HAWAIIAN HOME LANDS
PRELIMINARY SOIL REPORT

WAIANAE VALLEY, WAIANAE, OAHU, HAWAII
TAX MAP KEY: 8-5-04: 12, Por. 1 & 53

SCOPE OF EXPLORATION

The purpose of this exploration was to evaluate general soil conditions for site grading design considerations for residential development for the proposed Waianae Residence Lots - Unit 2 at Waianae Valley, Waianae, Oahu, Hawaii.

This report includes field explorations, laboratory tests, general recommendations for site grading and foundation design considerations and limitations.

FIELD EXPLORATION

Thirty-four exploratory borings and 8 open pits were made at various locations at the subdivision site. The approximate locations of the borings and open pits are shown on the Boring Location Sketch.

Borings were made with 4-in. diameter augers using T.C. drag bit and finger type bits. Open pits were made with a hoptoe. Soil samples were recovered with a standard split spoon sampler driven with a 140-lb hammer falling 30 inches.

Logs of six borings (Boring Nos. 2, 3, 4, 6, 7 and 10) from "Waianae Residence Lots - Unit 1," July 5, 1974, are attached for references.

LABORATORY TESTS

Laboratory tests included: natural water content, Atterberg limit, grain-size analysis, specific gravity, AASHO T-180-73I density and CBR.

A summary of the laboratory test results is given in Tables IA thru IK.

GEOLOGIC AND SOIL CLASSIFICATION BY OTHERS

From a review of geologic literature and the U. S. Soil Conservation Service maps of the area, the surface soils are generally described by others as follows:

Stearns, H. T. and U. S. Geological Survey, "Geologic and Topographic Map, Island of Oahu," USGS 1938:

Qa - Consolidated noncalcareous deposits.
Older alluvium.

U. S. Soil Conservation Service, "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," August 1972:

EwB - Ewa stony silty clay loam, 2 to 6% slopes.
Moderate shrink-swell potential.
Unified Soil Classification: ML, CL.

PvC - Pulehu very stony clay loam, 0 to 12% slopes.
Subject to flooding in low areas.
Moderate to low shrink-swell potential.
Unified Soil Classification: ML, CL & SM.

LPE - Lualualei extremely stony clay, 3 to 35% slopes. High shrink-swell potential. Susceptible to sliding on slopes more than 15%. Unified Soil Classification: CH

SOIL CLASSIFICATION SYSTEM

Soil samples were visually observed and subjected to appropriate tests in the laboratory. Based on visual observations and laboratory tests, the soil descriptions given on the boring logs are generally made in accordance with the "Unified Soil Classification System."

GENERAL SITE CONDITIONS

The proposed project is located in Waianae Valley, about 1-1/2 miles northeast of Farrington Highway between Waianae Valley Road and Paheehee Ridge. The project actually consists of 2 sites: Tax Map Key 8-5-04: 12 and Tax Map Key 8-5-04: Por. 1 & 53. Kaupuni Stream divides the project into two separate sites. The northwestern site is generally located between Waianae Valley Road and Kaupuni Stream and the southeastern site generally between Kaupuni Stream and Paheehee Ridge.

Northwestern Site

The northwestern site is fairly level with about 3 to 5% gradient down toward the southwest. The southern corner near the stream bank is generally steeper with slopes varying from about 25 to 50%.

Southeastern Site

The site is at the foot of Paheehee Ridge.

A drainageway near the foot of Paheehee Ridge divides the site into 2 parts. The portion northwesterly of the drainageway or about 2/3 of the site is fairly flat with about 2 to 5% gradient down toward the southwest with localized variations. The portions southeasterly of the drainageway or about 1/3 of the site generally slopes at about 3 to 10% gradient down toward the southwest with localized variations.

A dairy is located near the northeast boundary upstream of the site. It appears that waste water from the dairy is being discharged into the above drainageway.

The site is generally covered with kiawe trees, brush and weeds. Several rock walls cross portions of the site.

Two earth reservoirs were noted at the northerly end of the site.

INTERPRETATION OF SOIL CONDITIONS

From the field exploration and laboratory test results, the soil conditions encountered in the borings may be generally approximated as follows:

Northwestern Site

A surface layer of dark brown clay (CH) to 2 to 5-ft depth underlain by sandy silt, decomposed rock, cobbles and boulders to about 20 ft, the maximum depth drilled.

Southeastern Site

Portion northwesterly of drainageway: Reddish-brown silty clay (ML-CL) to about 1 ft or less (probably fill) underlain by gray-brown clay (CH) to about 5 ft underlain by sandy silt interspersed with cobbles, boulders and decomposed rocks to 20 ft, the maximum depth drilled.

Portion southeasterly of drainageway (along the bottom of Paheehee Ridge): Clay (CH) soils and boulders were encountered to a depth of about 2 to 5 ft followed by clayey and sandy silts, boulders, cobbles and decomposed rocks to 15 ft, the maximum depth drilled.

Rocky material was encountered at 2 to 11-ft depths in some borings and open pits.

Water was not noted in the borings during the field explorations.

Variations to the above soil conditions are to be expected between borings and in localized areas. For more detailed descriptions of soils encountered in the borings, refer to the boring logs.

DISCUSSION AND RECOMMENDATIONS

The present plan is to clear and grade the site for single-family residential development.

The preliminary plan indicates cuts and fills of generally less than about 10 ft.

Most of the surface (0 to 5± ft) soils at both sites may be expansive "CH" clays.

However, it appears that a portion of the southeastern site was filled or covered with about a one foot cover of red clayey silt "ML-CL" soil.

Because the surface soils are generally clay (CH), the site grading design should consider the use of low and fairly gentle slopes. In sloping areas, grading design may consider excavating upper areas to remove driving forces and filling lower areas for resistance to downhill movement. The average cross slope of the site in adobe should be kept below a 12% slope.

Existing drainageways that cross the sites should be stripped down to stiff natural ground before the start of fill construction. Subdrains should be placed along the bottoms of natural drainageways before the placement of fills.

The loose material on the bottom and sides of the existing reservoir should be stripped down to firm ground before the placement of fills.

For the soil exploration, open pits were made. The open pits were temporarily covered with loose fills. The pits should be located and marked on the plan. The loose fill should be removed to stiff ground, backfilled and recompacted in thin lifts during the mass grading work.

Along the toe of Paheehee Ridge, the designer should avoid locating houselots directly in the path of natural drainageways that may extend down the slopes of the ridge.

Boulders

Since cobbles, boulders and decomposed rocks were noted in various portions of the site and were encountered near the surface in most borings, cobbles and boulders may be anticipated in most cuts. The deeper the cut, the greater quantity of boulders might be expected. If large quantities of cobbles and boulders are encountered during the grading work, a disposal site for the boulders and a source of off-site borrow may have to be considered.

Boulders may be used to construct fill slopes away from building locations. Filter blankets of granular material should be placed between the boulder fill and the natural ground or compacted fills. See Figure 1.

The preliminary plan indicates that the southeast project limit may be fairly close to the toe of the Paheehee Ridge. After the project limit is defined, a study should be made to determine the possible hazard of boulders rolling down to the project.

Site Grading

Surface vegetation and miscellaneous debris and rubbish should be cleared and removed prior to site filling. Localized soft pockets encountered during site preparations should be excavated and replaced with select soils compacted in thin lifts.

Provisions to drain the site should be included during and after the grading operations.

Grading work should be done in accordance with the Revised Ordinances of Honolulu, 1969 As Amended and as recommended below:

1. The area should be cleared and grubbed.

2. Topsoil should be stripped to stiff natural ground before the placement of fills.

3. Localized soft pockets and pockets of unsuitable material encountered during site preparation should be excavated and replaced with selected material compacted in thin lifts.

4. Use of clay soils in fills on sloping areas should be avoided. On-site clay soils should generally be placed in the deeper portions of fills in flatter areas and away from the faces of slopes. Selected on-site soils or borrow soils should be placed in the upper 2 to 3 ft of fills for roadways, parking areas, building pads and in the outer portions of slopes, if practicable.

5. Where fills are proposed on sidehill areas, gullies and in drainageways, loose material at the bottoms and sides should be stripped down to stiff natural ground before the placement of fills.

6. Trenches should be cut and subdrains installed along the bottoms of natural drainageways or dips before the placement of fills. The locations of subdrains should be determined in the field after clearing and grubbing. See attached sketch for subdrain, Figure 2.

7. Fills should be constructed in approximately level layers starting at the lower end and working upward. Where fills are made on sloping areas steeper than about 5 horizontal to 1 vertical, the ground at the toe of the fill should be benched to a generally level condition. As the fill is brought up, it should continually be keyed into the stiff natural ground by cutting steps into the slopes and compacting the fill into these steps.

8. If boulders are proposed to be used in the construction of fills, they should be generally placed along the toe sections of fill slopes and outside of probable building sites. Before placing the boulders, the subgrade should be stripped to stiff natural ground and shaped to drain. A transition layer of select granular material (6-in. to dust sizes) should be placed on the subgrade and the boulders placed on the select material. A transition layer of select granular material should also be placed against boulders before earth fills are placed against the boulders. Earth fills may be used in the void spaces between boulders. See attached sketch, Figure 1.

9. Thin sidehill fills (sliver fills) on sloping areas should be avoided.

10. "CH" clay soils are generally expansive. To minimize the expansive characteristics, fills with clay soils should be placed on the wet side of optimum.

Fills should be laid in 6-in. compacted layers to 90% of the maximum density determined by the AASHO T-180-73I test method. In roadway areas, the top 2 ft of fill should be compacted to 95% of the maximum density.

Slopes

In general, the average cross slope over the site in clay soils should be kept flatter than about 8 horizontal to 1 vertical slope or 12% gradient.

In low cuts and fills, the following slopes may be considered:

In "CH" clays less than 6 ft in height, 3 to 1 slope.

In "CH" clays more than 6 ft in height but less than 10 ft, a cover over the sloped surface with select material should be considered.

In silty and granular soils, 2 to 1 slope.

If slope heights, (top to toe) greater than 15 ft are considered, 8-ft-wide benches should be placed at height intervals of about 15 ft.

Along the stream banks, 3 to 1 or flatter slopes should be used unless the toes of slopes up to the flood level are constructed of boulders and a free draining condition is provided. If a boulder

toe is constructed as sketched in Figure 1, the slope may be constructed at a 2 horizontal to 1 vertical slope ratio as a general case. Slope adjustments may be needed where clay pockets or soft pockets are encountered.

To minimize erosion, the runoff from rainstorms should be diverted by berms or ditches away from slopes whenever practicable.

The surface of fill slopes should be compacted by cat-tracking or with a sheepsfoot roller.

Slope planting is recommended on cut and fill slopes to minimize erosion.

Slope adjustments or other precautions may be necessary if seepage zones or expansive clay pockets are encountered in localized areas.

Foundations for Residential Structures

Light, single family residences are contemplated.

Because the surface soils on the site are generally clay (CH) soils with water contents on the dry side of optimum, the soils will tend to shrink and swell.

For swelling soils, post-and-beam construction with deep foundations are generally recommended.

Slab-on-ground type foundations on expansive soils should generally be avoided.

If slab-on-ground construction is being considered, it should be used on fairly level lots where the structures are located away from the tops of slopes. To minimize the effect of shrinking and swelling of the clay "CH" soils that are encountered near finish grade, the surface clay soils should be replaced with select non-expansive materials. The select materials should be placed over the building site and several feet beyond the perimeter of the building to a depth of about 2 to 3 ft below footings and slabs on ground. The replacement of clay soils should also be considered under the carports and driveways. The clay soils at the bottom of the excavation should be scarified and compacted on the wet side of optimum moisture, kept moist and not allowed to dry before placing the select material.

For lots along the toe of Paheehee Ridge, post-and-beam with deep foundations are generally recommended.

Post-and-beam with deep foundations are also recommended on lots next to the stream and on fill lots constructed over old natural drainageways and over the reservoir site.

Where buildings are contemplated on lots about 7 horizontal to 1 vertical and steeper or where buildings are close to tops of slopes, foundations should be evaluated on an individual basis.

The foundation and structure should be designed to resist and tolerate movements from some shrink and swell effects of the underlying clays.

Other general guidelines for foundation design considerations for light residential structures follow:

1. Footings should rest on stiff natural ground or on compacted fill.

2. Soft spots or pockets of loose material and boulders or hard spots encountered in footing excavations or below the building pads should be excavated and replaced with select non-expansive material compacted in thin lifts.

3. Because of the downhill creep effect of soils on a slope, some settlements may occur near the tops of slopes. Buildings should generally be placed about 15 to 20 ft from the tops of slopes.

4. Construction of retaining walls on slopes should generally be avoided.

5. Good surface drainage away from the foundations of structures should be maintained and the site should be graded to prevent the ponding of water.

Roadway

In general, for light automobile traffic and drained subgrade conditions, the roadway pavement section for the general soil conditions may be as follows:

1. Wearing course - 2-in. asphaltic concrete.
2. Base course - 6-in. base course.
3. Subbase course - 6-in. select borrow subbase course.
4. Borrow - 18-in. borrow in adobe "CH" soil areas.

In the major portion of the site where clay "CH" surface soils were encountered, about an 18-in. borrow course should be placed below the subbase course.

Provisions should be made in the contract documents to allow for local adjustments regarding select borrow subbase and borrow requirements in the field in accordance with the design standards of the City and County of Honolulu. In fill areas, the use of select soils within the top 2 to 3 ft of the subgrade may reduce the thickness of or eliminate the need for the select borrow subbase or borrow courses.

The subgrade should be compacted and shaped to drain. To avoid the ponding of water and softening of the subgrade, weep holes should be placed at subgrade levels thru the walls of the catch basins which are placed in these low areas.

Utilities

Utilities should be placed after the fills are constructed.

The bottoms of utility trenches should be daylighted for drainage and graded to drain water, particularly near the tops and toes of slopes. The backfill of trenches should be well compacted, particularly at the toes of slopes.

Utility lines should be designed with flexible joints, particularly where lines are connected to structures.

Unforeseen Conditions

Because of the variability of soil deposits, site improvements, designs and construction techniques, conditions may be encountered that cannot be foreseen with even the most exhaustive studies of site and project conditions. These unforeseen conditions should be recognized and then evaluated so that the designs or the construction methods may be modified accordingly, if necessary.

Unforeseen or undetected conditions such as soft spots, existing utility trenches, underground structures, voids or cavities, old tunnels, boulders, expansive soil pockets or seepage water, etc., may occur in localized areas and will have to be adjusted and corrected in the field as they are detected.

Site Regrading

After mass grading work is done and cuts and fills are made according to the grading plans, regrading at some future date should be avoided unless done under the guidance of a soils engineer.

PROPOSED SPECIFICATION FOR EARTHWORK

WAIANAE RESIDENCE LOTS - UNIT 2

HAWAIIAN HOME LANDS

General Description

This item shall consist of clearing and grubbing, preparing of land to be filled, excavating and filling of the land, spreading, compacting and testing of the fill, and subsidiary work for grading the site.

Clearing, Grubbing and Preparing Areas to be Filled

Vegetation, rubbish and miscellaneous material shall be removed and disposed of, leaving the disturbed area with a neat, debris-free appearance.

Topsoil and stockpiled soils shall be stripped to stiff natural ground before the placement of fills. Loose surface soils encountered at finish grade shall be scarified and recompacted.

Hard surfaces of existing roadways shall be scarified down to stiff soils and recompacted to match the density of the surrounding soil.

The bottoms and sides of gullies or natural drainageways shall be stripped down to stiff natural ground before the placement of fills.

Subdrains shall be placed along the bottoms of natural drainageways before the placement of fills.

Where fills are constructed on sloping areas steeper than about 5 horizontal to 1 vertical, the ground at the toe of the fill shall be benched to a generally level condition. As the fill is constructed in

approximately level layers, it shall continually be keyed into the stiff natural ground by cutting steps into the slopes and compacting the fill into these steps.

Materials

Fill material shall consist of selected on-site soils or approved borrow soils. The soils shall contain no more than a trace of organic and deleterious matter.

Borrow soils shall be selected soils generally less than 6-in. maximum size, with more than 30% fines and a plasticity index generally less than 20. (The plasticity index requirement may be modified depending on other properties.)

Fill material placed on the top 2 ft of fills shall generally contain less than 30% gravel.

Placing, Spreading and Compacting Fill Material

The selected fill material shall be placed in level layers which, when compacted, shall not exceed 6 inches. Each layer shall be spread evenly and blade-mixed during the spreading to attain uniformity of material and water content within each layer.

Rocks or cobbles shall not be allowed to nest, and voids between rocks shall be filled and compacted with small stones or earth.

When the water content of the fill material is well below the optimum for compacting purposes, water shall be added until the water content is near the optimum.

When the water content of the material is well above the optimum for compacting purposes, the fill material shall generally be aerated by blading or by other satisfactory methods until the water content is near the optimum.

For "CH" clay soils, to minimize the expansive characteristics, fills with clay soils shall be placed on the wet side of optimum moisture.

After each layer has been placed, mixed and spread evenly, it shall be compacted to 90% of maximum density in accordance with AASHO T-180-73I or other comparable density tests. For fills in roadway areas, the top 2 ft of fill shall be compacted to 95% of the maximum density.

Compaction shall be with sheepsfoot rollers, multiple-wheel pneumatic-tired rollers or other acceptable rollers which shall be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is near the specified water content. The rolling of each layer shall be continuous over its entire area, and the roller shall make sufficient passes to obtain the desired density.

Field density tests shall be made to get an indication of the compaction of the fill. Where sheepsfoot rollers are used, the soils may be disturbed to a depth of several inches. Density reading shall be taken as often as necessary in the compacted material below the disturbed surface. When these readings indicate that the density of a layer of fills or portion thereof is below the required density, that layer or portion shall be reworked until the required density has been obtained.

The fill operation shall be continuous in 6-in. compacted layers, as specified above, until the fill has been brought up to the finished slopes and grades as shown on the accepted plans.

Boulder Fills

If boulders are used for the construction of fills, they shall be generally placed along the toe sections of slopes and outside of probable building sites. The subgrade shall be stripped to stiff natural ground, shaped to drain and a transition layer of select granular material (6 in. to dust sizes) shall be placed on it. The boulders shall be placed on the select granular material. A transition layer of select granular material shall be placed against the boulder fill before construction of fills against it. Earth fills may be used in the void spaces between boulders.

Excavation

Suitable material from excavation shall be used in the fill and unsuitable material from excavation shall be disposed of.

Unforeseen Conditions

If unforeseen or undetected conditions such as soft spots, existing utility trenches, structure foundations, voids or cavities, boulders, seepage water or expansive soil pockets, etc., are encountered, corrective measures shall be made in the field as they are detected.

Rainy Weather

Fill material shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests indicate that the water content and density are as previously specified.

BORING LOGS

The stratification lines shown on each of the boring logs represent the approximate boundary between soil types and the transition may be gradual.

Symbols

Symbols used generally are in accordance with the Unified Soil Classification System.

Where a parenthesis "(MH)" is used, the soil sample was classified by visual observation of the sample recovered.

Where no parenthesis "MH" is used, the soil sample was classified from either the Atterberg limit or grain-size analysis test results.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 1 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: OCT. 22, 1974
Field Party: MEYER, SHIGENAGA, LEE
Type of Boring: AUGER (MOBILE B-50) Diam.: 4"
Elev.: 238'± * Datum: —
Drill Bit: FINGER TYPE

Water Level	NOT NOTICED			
Time	—			
Date	10-22-74			

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV.: 238'± ↓	0								
CL		STIFF, REDDISH BROWN SILTY CLAY			1-A	24	18	46	-	-	
	2.4'-5.0' 12 MIN.	LIGHT GRAY PUKA PUKA ROCK			1-B	ROCK FRAGMENTS					40/0.4' HAMMER BOUNCES
	5.0'-10.0' 1 HOUR	ROCK OR BOULDER	5		1-C	NO RECOVERY					10/0.0' HAMMER BOUNCES
		END OF BORING @ 10' 10-22-74	10								

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 2 Sheet No. _____ of _____
Driller W. LUM ASSOC. INC. Date OCT. 25, 1974
Field Party MEYER, LEE, SHIGENAGA
Type of Boring AUGER (MOBILE B-50) Diam. 4"
Elev. 238'± * Datum —
Drill Bit FINGER TYPE

Water Level	NOT NOTICED			
Time	—			
Date	10-25-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 238'± *	0								
ML-CL	STIFF, REDDISH BROWN SILTY CLAY					16				
				2-A	26	20	84	—	—	
CH	STIFF BROWN CLAY			2-B	NO RECOVERY					3"/0.1'
	BOULDER	5								HAMMER BOUNCES
					NOTE: MOVED BORING TWO TIMES. SAME RESULTS.					
	END OF BORING @ 6.5' 10-25-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 3 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: OCT. 29 & 30, 1974
Field Party: KAKU, KAU
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 232'± * Datum: —
Drill Bit: T.C. DRAG

Water Level	NOT NOTED			
Time	—			
Date	10-29-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 232'± *	0								
(ML)	STIFF, TAN BROWN CLAYEY SILT W/TRACES OF DECOMPOSED ROCK			3-A	—	17 20	—	—	—	
CH	STIFF, BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS			3-B	26	24	88	—	—	
(MH)	STIFF, MOTTLED BROWN CLAYEY SILT W/TRACES OF DECOMPOSED ROCK & ROOTS	5		3-C	—	24	—	—	—	50/0.5'
	GRAY-BROWN PUKA PUKA ROCK	10		3-D	NOT ENOUGH RECOVERY					30/0.1'
	END OF BORING @ 12' 10-30-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES Lot. 2 & 3

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 4 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date JAN. 6, 1975

Field Party KAKU, SHIGENAGA

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 240'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	1-6-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 240'± *	0								
(CH)	STIFF, DARK BROWN CLAY W/TRACES OF ROOTS			4-A	—	19	—	—	—	
CH	STIFF, DARK BROWN CLAY W/TRACES OF ROOTS & GRAVEL	5		4-B	—	23	—	—	—	
				4-C	30	28 25	63	—	—	46
(MH)	STIFF, BROWN CLAYEY SILT W/TRACES OF SAND									
(MH)	STIFF, LIGHT BROWN CLAYEY SILT W/ SAND	10		4-D	—	26	—	—	—	50/0.5'
	BLUE ROCK ?									
		15		4-E	NO RECOVERY					50/0.1'
	END OF BORING @ 15.1' 1-6-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 5 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 22, 1974

Field Party MEYER, SHIGENAGA, LEE

Type of Boring AUGER (MOBILE B-50) Diam. 4"

Elev. 228'± * Datum —

Drill Bit FINGER TYPE

Water Level	NOT NOTICED				
Time	—				
Date	10-22-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 228'± *									
	LIGHT MOTTLED BROWN & GRAY DECOMPOSED ROCK & SANDY SILT			5-A	—	10	—	—	—	40
				5-B	—	16	—	—	—	50/0.5'
	BROWN DECOMPOSED ROCK	5		5-C	—	16	—	—	—	35/0.4' HAMMER BOUNCES
	ROCK OR BOULDER ?	10		5-D	No RECOVERY					30/0.3' HAMMER BOUNCES
	END OF BORING @ 15.2' 10-22-74	15		5-E	No RECOVERY					50/0.2'

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 6 Sheet No. ____ of ____

Driller: W. LUM ASSOC. INC. Date: OCT. 24, 1974

Field Party: METER, LEE, SHIGENAGA

Type of Boring: AUGER (MOBIL B-59) Diam.: 4

Elev.: 228'± * Datum: —

Drill Bit: FINGER TYPE

Water Level					
Time	—				
Date	10-24-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV.= 228'± *	0								
ML-CL		STIFF, REDDISH BROWN SILTY CLAY			G-A	26	9	43	—	—	
(ML)	4.5'-5.0' 15 MIN.	STIFF, MOTTLED REDDISH BROWN CLAYEY SILT W/ DECOMPOSED ROCK			G-B	—	18 17	—	—	—	46
(ML)	5.0'-7.0' 35 MIN.	STIFF, MOTTLED BROWN SANDY SILT W/ DECOMPOSED ROCK	5		G-C	NO RECOVERY					15/0.0'
		BOULDER									HAMMER BOUNCES
		END OF BORING @ 7' 10-24-74									

NOTE: MOVED BORING THREE TIMES. SIMILAR.

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140 # Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 7 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 30, 1974

Field Party KAKU, SHIGENAGA

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 222' ± * Datum —

Drill Bit T.C. DRAG

Water Level NOT NOTICED

Time —

Date 10-30-74

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 222' ± *	0							
(ML)	STIFF, TAN-BROWN CLAYEY SILT W/TRACES OF DECOMPOSED ROCK & ROOTS		T-A	–	15	–	–	–	
(CH)	STIFF, BROWN CLAY W/TRACES OF DECOMPOSED ROCK		T-B	–	20	–	–	–	45
		5	T-C	NO RECOVERY					30/0.3' HAMMER BOUNCES
	FRACTURED PIECES OF GRAY BROWN ROCK CUTTINGS	10	T-D	NO RECOVERY					20/0.0'
		15	T-E	–	21	–	–	–	25/0.5' 30/0.2' HAMMER BOUNCES
(ML)	HARD, TAN BROWN SANDY SILT W/TRACES OF DECOMPOSED ROCK	20	T-F	–	14	–	–	–	40/0.5'
	END OF BORING @ 21' 10-30-74								

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT 2 #3

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 8 Sheet No. _____ of _____
Driller: W. LUM ASSOC. INC. Date: JAN. 6, 1975
Field Party: KAKU, SHIGENAGA
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 230'± * Datum: —
Drill Bit: T.C. DRAG

Water Level				
Time	—			
Date	1-6-75			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 230'± *	0								
(CH)	STIFF, DARK BROWN CLAY W/TRACES OF ROOTS, SAND & GRAVEL			8-A	-	17	-	-	-	
		5								
SM	DENSE, MOTTLED BROWN SILTY SAND W/TRACES OF DECOMPOSED ROCK			8-B	-	20	-	-	-	52
					NOTE: MOVED 5' AWAY			HOLE		
	BLUE ROCK (?)	10		8-C	NO RECOVERY					30/0.0'
	END OF BORING @ 10' 1-6-75									HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 9 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: OCT. 22 & 23, 1974
Field Party: MEYER, SHIGENAGA, LEE
Type of Boring: AUGER (MOBILE B-50) Diam.: 4"
Elev.: 214' ± * Datum: —
Drill Bit: FINGER TYPE

Water Level	NOT NOTICED			
Time	—			
Date	10-23-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.: 214' ± *	0								
(ML-CL)	MEDIUM REDDISH BROWN SILTY CLAY			9-A	—	16 18	—	—	—	
	RED & LIGHT BROWN DECOMPOSED ROCK									
		5		9-B	NO	RECOVERY				20/0.0'
	BOULDERS & COBBLES									HAMMER BOUNCES
		10		9-C	NO	RECOVERY				30/0.1'
	END OF BORING @ 13' 10-23-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 10 Sheet No. ____ of ____

Driller: W. LUM ASSOC. INC. Date: OCT. 24, 1974

Field Party: MEYER, LEE, SHIGENAGA

Type of Boring: AUGER (MOBILE B-50) Diam.: 4"

Elev.: 218'± * Datum: —

Drill Bit: FINGER TYPE

Water Level	Not Noticed				
Time	—				
Date	10-24-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 218'± *	0								
(ML-CL)	STIFF, REDDISH BROWN SILTY CLAY			10-A	—	16	—	—	—	
CH	STIFF, DARK BROWN CLAY W/ SOME DECOMPOSED ROCK			10-B	27	24	94	—	—	24/0.5' 20/0.1' HAMMER BOUNCES
		5		10-C	NO RECOVERY					20/0.0' HAMMER BOUNCES
	PUKA PUKA ROCK, GOBBLES & BOULDERS									
		10		10-D	NO RECOVERY					15/0.0' HAMMER BOUNCES
	BOULDER									
		15		10-E	—	28	—	—	—	50/0.5'
(ML)	STIFF DARK BROWN & GRAY SANDY SILT W/SOME GOBBLES									
		20		10-F	NO RECOVERY					40/0.3' HAMMER BOUNCES
	END OF BORING @ 20.3' 10-24-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140 #
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 11 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date OCT. 31, 1974
Field Party KAKU, SHIGENAGA
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 212'± * Datum —
Drill Bit T.C. DRAG

Water Level					
Time	—				
Date	10-31-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV.= 212'± *	0								
(ML)		STIFF, MOTTLED BROWN CLAYEY SILT W/TRACES OF GRAVEL, DECOMPOSED ROCK & ROOTS			11-A	—	17	—	—	—	
					11-B	—	22 15	—	—	—	49/0.2'
(CH)		STIFF, BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS									HAMMER BOUNCES
		GRAY-BROWN PUKA PUKA DECOMPOSED ROCK W/TRACES OF CLAYEY SILT	5		11-C	—	26	—	—	—	50/0.5'
											HAMMER BOUNCES
(ML)		DENSE, MOTTLED TAN-BROWN SANDY SILT W/TRACES OF DECOMPOSED ROCK & GRAVEL	10		11-D	—	22	—	—	—	47/0.5'
											HAMMER BOUNCES
			15		11-E	—	26	—	—	—	50/0.5'
		19.0'-19.5' 30 MIN.									HAMMER BOUNCES
		END OF BORING @ 19.5' 10-31-74	20		11-F	NO	RECOVERY				20/0.0' HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 12 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date JAN. 6 & 7, 1975
Field Party KAKU, SHIGENAGA
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 230'± * Datum —
Drill Bit T.C. DRAG

Water Level	NOT NOTICED			
Time	—			
Date	1-7-75			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 230'± *	0								
(CH)	STIFF, BROWN CLAY W/TRACES OF SAND & ROOTS			12-A	—	21	—	—	—	
				12-B	—	27	—	—	—	14/0.5' 40/0.1'
		5		12-C	—	30	—	—	—	
(CH)	STIFF, MOTTLED BROWN CLAY W/TRACES OF SAND									
		10		12-D	ROCK FRAGMENTS					40/0.1'
	DENSE, BLUE ROCK									
		15		12-E		NO RECOVERY				30/0.0' HAMMER BOUNCES
	END OF BORING @ 15' 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 13 Sheet No. _____ of _____
Driller W. LUM ASSOC., INC. Date OCT. 23, 1974
Field Party MEYER, SHIGENAGA, LEE
Type of Boring AUGER (MOBILE B-50) Diam. 4" & 14"
Elev. 206'± * Datum —
Drill Bit FINGER TYPE & CLAY

Water Level	NOT NOTICED				
Time	—				
Date	10-23-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 206'± *									
14" AUGER W/ CLAY	BROWN, CLAY									
	ROCK W/BROWN CLAY									
4" AUGER W/ FINGER TYPE	STIFF, MOTTLED BROWN CLAYEY SILT & GRAVEL	5		13-A	ROCK FRAGMENTS					35/0.3' HAMMER BOUNCES
	BOULDERS & COBBLES W/CLAY POCKETS									
	END OF BORING @ 8.5' 10-23-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 14 Sheet No. ____ of ____

Driller: W. LUM ASSOC. INC. Date: OCT. 23, 1974

Field Party: MEYER, LEE, SHIGENAGA

Type of Boring: AUGER (MOBILE B-50) Diam.: 4"

Elev.: 208'± * Datum: —

Drill Bit: FINGER TYPE

Water Level					
Time	—				
Date	10-23-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 208'± *	0								
(ML-MH)	STIFF, BROWN CLAYEY SILT			14-A	-	19	—	-	-	
CH	STIFF, BROWN CLAY			14-B	24	22	83	-	-	
(SM)	DENSE, MOTTLED BROWN SILTY SAND W/GRAVEL & DECOMPOSED ROCK	5		14-C	-	20	—	-	-	48/0.5'
(SM)	DENSE, MOTTLED BROWN SILTY SAND W/GRAVEL	10		14-D	-	20	-	-	-	40/0.2' HAMMER BOUNCES
(ML)	STIFF, BROWN SANDY SILT W/GRAVEL	15		14-E	-	15	-	-	-	50/0.5' HAMMER BOUNCES
	END OF BORING @ 15.5' 10-23-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140 #
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 15 Sheet No. _____ of _____
Driller W. LUM ASSOC, INC. Date OCT. 24, 1974
Field Party MEYER, LEE, SHIGENAGA
Type of Boring AUGER (MOBILE B-50) Diam. 4"
Elev. 202'± * Datum —
Drill Bit FINGER TYPE

Water Level					
Time	—				
Date	10-24-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 202'± * 0									
CH	STIFF, BROWN CLAY			15-A	25	22	60	—	—	
(SM)	DENSE, BROWN SILTY SAND	5	H	15-B	—	15	—	—	—	20/0.1' HAMMER BOUNCES
	COBBLES & BOULDERS	10	H	15-C	NO	RECOVERY				10/0.0' HAMMER BOUNCES
MH-CH	STIFF, BROWN SILTY CLAY	15	H	15-D	39	34	54	—	—	30/0.5' HAMMER BOUNCES
	BOULDER OR COBBLES									
	END OF BORING @ 15.5' 10-24-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOTS 243

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 16 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date JAN. 7, 1975
Field Party KAKU, SHIGENAGA
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 208' ± * Datum —
Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 208' ± *	0								
(CH)	STIFF, DARK BROWN CLAY W/TRACES OF SAND & ROOTS			16-A	-	20	-	-	-	
		5	H	16-B	NO RECOVERY					50/0.0 HAMMER BOUNCES
	GRAY-BROWN ROCK (BOULDERS?)									
(MH-CH)	STIFF, MOTTLED BROWN SILTY CLAY W/TRACES OF DECOMPOSED ROCK	10	H	16-C	-	23	-	-	-	60/0.5
	GRAY-BROWN ROCK	15	H	16-D	ROCK FRAGMENTS					60/0.1 HAMMER BOUNCES
	END OF BORING @ 15.1' 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PH. II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 17 Sheet No. ____ of ____

Driller W. LUM ASSOC, INC. Date NOV. 1, 1974

Field Party KAKU, KAU

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 194 ± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	11-1-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 194' ± *	0								
CH		STIFF, BROWN CLAY W/TRACES OF ROOTS			17-A	24	21	82	—	—	
(CH)		STIFF, BROWN CLAY W/TRACES OF DECOMPOSED ROCK			17-B	—	21	—	—	—	47/0.5' HAMMER BOUNCES
		3.5-5.0 30 MIN.	5		17-C	ROCK		FRAGMENTS			50/0.1' HAMMER BOUNCES
		ROCK OR BOULDERS ?									
			10		17-D	ROCK		FRAGMENTS			40/0.1' HAMMER BOUNCES
		10.1' - 14.0' 30 MIN.									
		END OF BORING @ 14.0' 11-1-74		H	17-E	NO		RECOVERY			30/0.0' HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PH II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140 #
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 18 Sheet No. ____ of ____
Driller W. LUM ASS., INC. Date NOV. 1, 1974
Field Party KAKU, KAU
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 196'± * Datum —
Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	11-1-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 196'± ▽ *	0								
(CH)		STIFF, BROWN, CLAY W/TRACES OF ROOTS			18-A	–	18	–	–	–	
(CH)	4.0'-4.5' 20 MIN.	STIFF, GRAY CLAY W/TRACES OF GRAVEL & SAND			18-B	–	14	–	–	–	40/0.5'
	5.1'-8.0' 20 MIN.	GRAY-BROWN PUKA PUKA ROCK & BLUE ROCK ?	5		18-C	ROCK		FRAGMENT			30/0.1'
	8.5'-10.0' 30 MIN.										
	10.0'-13.0' 30 MIN.		10		18-D		NO	RECOVERY			30/0.0' HAMMER BOUNCES
		END OF BORING @ 13.0' 11-1-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PH II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140*
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 19 Sheet No. ____ of ____

Driller W. LUM ASS., INC. Date OCT. 31 & NOV. 1, 1974

Field Party KAKU, OSHIRO, KAU

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 192'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED	NOT NOTICED			
Time	—	—			
Date	10-31-74	11-1-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 192'± *	0								
(CH)	STIFF, LIGHT BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS			19-A	—	22 18	—	—	—	
CH	STIFF, BROWN CLAY W/TRACES OF ROOTS			19-B	23	22	62	—	—	4½0.5'
		5		19-C	—	26	—	—	—	41/0.5'
(ML)	DENSE, TAN-BROWN SANDY SILT W/ DECOMPOSED ROCK									
		10		19-D	NO RECOVERY					40/0.1' HAMMER BOUNCES
	END OF BORING @ 15.1' 11-1-74	15		19-E	NO RECOVERY					50/0.1' HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOTS

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight
Drop

SAMPLER:

OPEN PIT
~~BORING~~ NO. 20 Sheet No. ____ of ____

Driller HOOD CORPORATION Date JAN. 7, 1975

Field Party LAI (W. LUM ASSOC., INC.)

Type of Boring OPEN PIT (HOPTO) Diam. ____

Elev. 203' ± * Datum ____

Drill Bit ____

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 203' ± *	0								
(CH)	HARD, DARK BROWN CLAY W/ SOME GRAVEL & COBBLES			20-A	—	20	—	—	—	
	MEDIUM DENSITY TO DENSE TAN, CEMENTED SAND, GRAVEL, COBBLES & BOULDERS	5		20-B	—	13	—	—	—	
	ROCK									
	BOTTOM OF PIT @ 6' 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOTS 2

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:

Weight

Drop

SAMPLER:

OPEN PIT

~~BORING~~ NO. 21 Sheet No. ____ of ____

Driller HOOD CORPORATION Date JAN. 7, 1975

Field Party LAI (W. LUM ASSOC., INC.)

Type of Boring OPEN PIT (HOPTO) Diam. ____

Elev. 189'± * Datum ____

Drill Bit ____

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 189'± *	0								
CH	STIFF TO HARD DARK BROWN, CLAY W/GRAVEL & COBBLES		H	21-A	–	21	–	–	–	
	DENSE, TAN BROWN SILTY SAND, GRAVEL, DECOMPOSED ROCK & COBBLES	5	H	21-B	–	23	–	–	–	
			H	21-C	–	18	–	–	–	
	BOTTOM OF PIT @ 8'± 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOTS 2

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12,
Por. 1 & 53

HAMMER:
Weight
Drop

SAMPLER:

OPEN PIT
~~BORING~~ NO. 22 Sheet No. ____ of ____
Driller HOOD CORPORATION Date JAN. 7, 1975
Field Party LAI (W. LUM ASSOC., INC.)
Type of Boring OPEN PIT (HOPTO) Diam. ____
Elev. 184'± * Datum ____
Drill Bit ____

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 184'± ↓ * 0									
CH	STIFF TO HARD DARK BROWN CLAY W/SOME COBBLES		H	22-A	22	18	73	–	–	
GW	DENSE, TAN BROWN SAND & GRAVEL W/COBBLES & DECOMP. ROCK	5	OH	22-B	–	16	–	–	–	
	WEATHERED ROCK?									
	BOTTOM OF PIT @ 6'± 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOTS

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight
Drop

SAMPLER:

OPEN PIT
~~BORING~~ NO. 23 Sheet No. ____ of ____

Driller HOOD CORPORATION Date JAN. 7, 1975

Field Party LAI (W. LUM ASSOC., INC.)

Type of Boring OPEN PIT (HOPTO) Diam. ____

Elev. 176' ± * Datum ____

Drill Bit ____

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.: 176'± *	0								
(CH)	STIFF TO HARD DARK BROWN CLAY W/COBBLES & BOULDERS	2		23-A	—	21	—	—	—	
	ROCK (SLIGHTLY WEATHERED)									
	BOTTOM OF PIT @ 2'± 1-7-25									
	NOTE: THREE ATTEMPTS MADE WITHIN 25' DISTANCE WITH SAME RESULTS									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOTS

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:

Weight

Drop

SAMPLER:

OPEN PIT

~~BORING~~ NO. 24 Sheet No. ____ of ____

Driller HOOD CORPORATION Date JAN. 7, 1975

Field Party LAI (W. LUM ASSOC., INC.)

Type of Boring OPEN PIT (HOPTO) Diam.

Elev. 176'± * Datum

Drill Bit

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 176'± *	0								
(CH)	HARD, DARK BROWN CLAY		H	24-A	-	20	-	-	-	
CH	HARD, BROWN CLAY W/ GYPSUM	5	H	24-B	26	26	87	-	-	
CH	STIFF, BROWN CLAY W/ SOME COBBLES		H	24-C	28	23	59	-	-	
	BOTTOM OF PIT @ 8.5' 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOTS 9 & 53

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

OPEN PIT

PROJECT HAWAIIAN HOME LANDS

BORING NO. 25 Sheet No. ____ of ____

LOCATION Waianae Valley, Oahu, Hawaii

Driller HOOD CORPORATION Date JAN. 7, 1975

Tax Map Key: 8-5-04: 12, Por. 1 & 53

Field Party AI (W. LUM ASSOC., INC.)

Type of Boring OPEN PIT (HOPTO) Diam. ____

Elev. 151' ± * Datum ____

HAMMER:

Drill Bit ____

Weight ____

Drop ____

SAMPLER: ____

Water Level	NOT NOTICED			
Time	-			
Date	1-7-75			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 151' ± *	0								
GH	STIFF, DARK BROWN CLAY		H	25-A	-	19	-	-	-	
MH-GH	COBBLE, BOULDER & BROWN, SILTY CLAY W/POCKETS OF CLAY	5	H	25-B	-	24	-	-	-	
MH	HARD, BROWN CLAYEY SILT		H	25-C	-	22	-	-	-	
	BOTTOM OF PIT @ 9'± 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOTS

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii — Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight ____ Drop ____

SAMPLER: ____

OPEN PIT ~~BORING~~ NO. 26 — Sheet No. ____ of ____

Driller: HOOD CORPORATION — Date: JAN. 7, 1975

Field Party: LAI (W. LUM ASSOC., INC.)

Type of Boring: OPEN PIT (HOPTO) — Diam. ____

Elev.: 152' ± * — Datum ____

Drill Bit ____

Water Level	NOT NOTICED				
Time	—				
Date	1-7-75				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 152' ± *	0								
CH	HARD, DARK BROWN, CLAY		H	26-A	—	20	—	—	—	
SW-SM	DENSE, BROWN & TAN SAND W/GRAVEL (SOME CEMENTATION)		Ho	26-B	—	22	—	—	—	
(MH)	HARD, BROWN CLAYEY SILT W/SOME GRAVEL	5	H	26-C	—	31	—	—	—	
(SM)	DENSE, BROWN SILTY SAND W/GRAVEL		Ho	26-D	—	20	—	—	—	
	BOTTOM OF PIT @ 9'± 1-7-75	10								

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT 2

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight
Drop

SAMPLER:

OPEN PIT
~~BORING~~ NO. 27 Sheet No. ____ of ____
Driller HOOD CORPORATION Date JAN. 7, 1975
Field Party LAI (W. LUM ASSOC., INC.)
Type of Boring OPEN PIT (HOPTO) Diam.
Elev. 166'± * Datum
Drill Bit

Water Level	NOT NOTICED			
Time	—			
Date	1-7-75			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 166'± *	0								
CH	STIFF, DARK BROWN CLAY, COBBLES & BOULDERS		HC	27-A	—	16	—	—	—	
SM	MEDIUM DENSITY TO DENSE TAN BROWN SILTY SAND W/ GRAVEL, COBBLES & DECOMPOSED ROCK	5	H	27-B	—	17	—	—	—	
			H	27-C	—	26	—	—	—	
	ROCK									
	BOTTOM OF PIT @ 8'± 1-7-75									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140 #
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 28 Sheet No. _____ of _____
Driller W. LUM ASSOC. INC. Date OCT. 21, 1974
Field Party KAKU, SEAWELL
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 178'± * Datum _____
Drill Bit T.C. DRAG

	Water Level				
	Time				
	Date				

Unified Soil Classification / DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 178'± *	0								
(CH)	STIFF DARK BROWN SILTY CLAY W/ROOTS			28-A	–	20	–	–	–	
2.5'-5.0' 25 MIN.	GRAY, ROCK W/MOTTLED BROWN & GRAY DECOMPOSED ROCK			28-B	ROCK FRAGMENTS					30/0.2'
		5		28-C	NO RECOVERY					30/0.1'
	END OF BORING @ 5' 10-21-74				NOTE: AT 5.0' DEPTH MOVED HOLE 4.0' AWAY HIT BOULDER. MOVED 4' AWAY & HIT BOULDER.					

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 29 Sheet No. ____ of ____

Driller W. LUM ASSOC. INC. Date OCT. 22, 1974

Field Party KAKU, OSHIRO

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 180'± * Datum —

Drill Bit T.C. DRAG

Water Level					
Time	—				
Date	10-22-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 180'± *	0								
(CH)	2.0'-3.5' 10 MIN.	STIFF, DARK BROWN CLAY W/TRACES OF GRAVEL & ROOTS			29-A	25	19	68	—	—	
		COBBLE OR BOULDER	5								
(SM)		HARD, BROWN SILTY SAND W/TRACES OF GRAVEL			29-B	—	14	—	—	—	30/0.1'
	7.0'-9.0' 35 MIN.	DECOMPOSED ROCK, COBBLES OR BOULDERS?									
	10.0'-10.5' 20 MIN	END OF BORING @ 10.5' 10-22-74	10		29-C	No	RECOVERY				20/0.0' HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 30 Sheet No. ____ of ____

Driller W. LUM ASSOC. INC. Date OCT. 18 & 21, 1974

Field Party KAKU, KAU, OSHIRO

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 184' ± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	10-18-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV.: 184' ± *	0								
GH		STIFF, DARK BROWN CLAY W/ TRACES OF ROOTS & DECOMPOSED ROCK			30-A	—	17 20	—	—	—	19/0.5' 20/0.1' HAMMER BOUNCES
		DECOMPOSED ROCK & TRACES OF CLAY	5		30-B	—	20	—	—	—	20/0.2'
(SM)	5.0'-10.0' 25 MIN.	COBBLE OR BOULDER DENSE, BROWN SILTY SAND W/TRACES OF DECOMPOSED ROCK				NOTE: HIT BOULDER AT 7.0'. DRILL TIME 35 MIN. MOVED 3.0' MAUKA					
		COBBLES OR BOULDERS	10		30-C	NO RECOVERY					30/0.0' HAMMER BOUNCES
	10.0'-13.5' 35 MIN.	END OF BORING @ 13.5' 10-21-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 31 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 18, 1974

Field Party KAKU, KAJ, OSHIRO

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 188'± * Datum —

Drill Bit T.C. DRAG

Water Level					
Time	—				
Date	10-18-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 188'± *	0								
CH		STIFF, DARK BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS			31-A	24	24	68	—	—	
SM		DENSE, BROWN SILTY SAND			31-B	—	11	—	—	—	
			5		31-C	NO RECOVERY					30/0.0' HAMMER BOUNCES
	5.0'-10.0' 15 MIN.	COBBLE OR BOULDER									
(SM)		DENSE, BROWN SILTY SAND W/GRAVEL	10		31-D	—	8	—	—	—	30/0.1'
	10.6'-15.0' 20 MIN.	COBBLES OR BOULDERS									
			15		31-E	ROCK FRAGMENTS					40/0.1'
		END OF BORING @ 15.1' 10-18-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 32 Sheet No. ____ of ____

Driller: W. LUM ASSOC. INC. Date: OCT. 17, 1974

Field Party: KAKU, KAU, OSHIRO

Type of Boring: AUGER (VERSA DRILL) Diam.: 4"

Elev.: 200'± * Datum: —

Drill Bit: T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	10-18-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 200'± *	0								
(CH)	STIFF, DARK BROWN CLAY W/ROOTS & TRACES OF ASH			32-A	—	17 16	—	—	—	27/0.5 20/0.0 HAMMER BOUNCES
				32-B	—	16	—	—	—	30/0.1 HAMMER BOUNCES
(SM)	DENSE, TAN BROWN SILTY SAND W/DECOMPOSED ROCK	5		32-C	NO RECOVERY					30/0.0 HAMMER BOUNCES
					NOTE: HIT BOULDER AT 7.5'. DRILL TIME 30 MIN. MOVED 3.0 MAU A.					
		10		32-D	—	28	—	—	—	50/0.5 HAMMER BOUNCES
(ML-MH)	STIFF, BROWN SANDY SILT	15		32-E	—	25	—	—	—	45/0.5 HAMMER BOUNCES
		20		32-F	—	20	—	—	—	50/0.5
	END OF BORING @ 21' 10-18-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT - PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT HAWAIIAN HOME LANDS

LOCATION Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 33 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date OCT. 17, 1974
Field Party KAKU, KAU
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 208'± * Datum —
Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	10-17-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 208'±	0								
(CH)		MEDIUM, DARK BROWN CLAY W/TRACES OF ROOTS			33-A	—	13	—	—	—	8/0 5' → 30/0.2' HAMMER BOUNCES
	1.7'-3.5' 5 MIN.	COBBLE OR BOULDER	5		33-B	—	17	—	—	—	50/0.1' HAMMER BOUNCES
(ML)		STIFF, BROWN SANDY SILT W/TRACES OF DECOMPOSED ROCK	10		33-C	—	21	—	—	—	50/0.4'
	13.5'-15.0' 45 MIN.	BOULDER?	15		33-D	NO RECOVERY					30/0.0' HAMMER BOUNCES
		END OF BORING @ 15' 10-17-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 34 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: OCT. 22 & 23, 1974
Field Party: KAKU, OSHIRO
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 212'± * Datum: —
Drill Bit: T.C. DRAG

Water Level	NOT NOTICED			
Time	—			
Date	10-22-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 212'± *	0								
(CH)	STIFF, BROWN CLAY W/TRACES OF GRAVEL & ROOTS			34-A	-	19 11	-	-	-	27/0.5' 30/0.1'
(GM)	DENSE, MOTTLED BROWN SILTY GRAVEL & DECOMPOSED ROCK W/SAND	5		34-B	NO RECOVERY NOTE: MOVED HOLE 5' AWAY.					30/0.0' HAMMER BOUNCES
MH	STIFF, BROWN CLAYEY SILT W/TRACES OF SAND	10		34-C	37	28	53	-	-	67
(MH-CH)	STIFF, BROWN W/TRACES OF TAN BROWN SILTY CLAY	15		34-D	-	23	-	-	-	40/0.5'
	GRAY BROWN PUKA PUKA ROCK END OF BORING @ 20.1' 10-23-74	20		34-E	NO RECOVERY					30/0.1' HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 35 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC Date OCT. 23, 1974

Field Party KAKU, OSHIRO

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 214'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED			
Time	—			
Date	10-23-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.= 214'± *	0								
CH	STIFF, BROWN CLAY W/TRACES OF GRAVEL & ROOTS			35-A	23	19	74	-	-	
	COBBLE OR BOULDER									
	GRAY BROWN PUKA PUKA ROCK	5		35-B	ROCK FRAGMENTS					40/0.1' HAMMER BOUNCES
	COBBLE OR BOULDER W/CLAY POCKETS									
(MH)	STIFF, BROWN CLAYEY SILT W/TRACES OF SAND & DECOMPOSED ROCK	10		35-C	-	31	-	-	-	40/0.3'
	COBBLE OR BOULDER W/CLAY POCKETS									
(SM)	DENSE, BROWN SILTY SAND	15		35-D	-	19	-	-	-	57/0.5'
(ML-MH)	STIFF, BROWN SANDY SILT	20		35-E	-	26	-	-	-	50/0.5'
	END OF BORING @ 20.5' 10-23-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 36 Sheet No. ____ of ____

Driller M. LUM ASSOC., INC. Date OCT. 24, 1974

Field Party KAKU, OSHIRO

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 228'± * Datum —

Drill Bit T.C. DRAG

Water Level NOT NOTICED

Time —

Date 10-24-74

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
CH		STIFF, BROWN CLAY W/TRACES OF ROOTS			36-A	—	18	—	—	—	
					36-B	24	18	59	—	—	70
(GP-GM)		DENSE, BROWN GRAVEL W/SILTY SAND	5		36-C	—	9	—	—	—	50/0.5'
	8.0'-9.5' 15 MIN.	COBBLE OR BOULDER									
(ML)		STIFF, BROWN SANDY SILT & PUKA PUKA ROCK	10		36-D	—	18	—	—	—	60/0.5' HAMMER BOUNCES
		COBBLE OR BOULDER									
(MH)		STIFF BROWN W/SOME WHITE CLAYEY SILT	15		36-E	—	24	—	—	—	40/0.5'
(SM)		DENSE, BROWN SILTY SAND W/GRAVEL	20		36-F	—	23	—	—	—	
		END OF BORING @ 21.5' 10-24-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 37 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 25, 1974

Field Party KAKU, OSHIRO

Type of Boring AUGER (TERSA DRILL) Diam. 4"

Elev. 234'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	10-25-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 234'± *	0								
(CH)	3.5'-4.5' 10 MIN.	STIFF, BROWN, CLAY W/TRACES OF GRAVEL, DECOMPOSED CORAL & ROOTS			37-A	–	21	–	–	–	
(SM)		DENSE, BROWN SILTY SAND W/GRAVEL			37-B	–	9	–	–	–	40/0.5' HAMMER BOUNCES
			5		37-C	–	13	–	–	–	50/0.4' HAMMER BOUNCES
SM		DENSE, LIGHT BROWN SILTY SAND W/TRACES OF GRAVEL									
			10		37-D	–	20	–	–	–	40/0.3' HAMMER BOUNCES
		GRAY-BROWN PUKA PUKA ROCK	15		37-E	ROCK FRAGMENTS					40/0.3' HAMMER BOUNCES
	19.5'-20.0' 30 MIN.		20		37-F	NO RECOVERY					HAMMER BOUNCES
		END OF BORING @ 20' 10-25-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

NAIAHAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS
UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 38 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: OCT. 24, 1974

Field Party: KAKU, OSHIRO

Type of Boring: AUGER (VERSA DRILL) Diam.: 4"

Elev.: 240'± * Datum: —

Drill Bit: T.C. DRAG

Water Level	Not Noticed				
Time	—				
Date	10-24-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 240'± *	0								
(CH)	STIFF, BROWN, CLAY W/TRACES OF ROOTS			38-A	—	20	—	—	—	
CH	STIFF, MOTTLED BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS	5		38-B	27	19	87	—	—	30/0.5'
				38-C	ROCK FRAGMENTS					30/0.1' HAMMER BOUNCES
	COBBLES & BOULDERS				NOTE: HARD DRILLING AT 6.2'. MOVED HOLE 5.0' AWAY. HARD DRILLING AT 4.0'. MOVED HOLE 5.0' AWAY.					
(SM)	DENSE, BROWN SILTY SAND	10		38-D	-	24	-	-	-	50/0.5'
	COBBLE OR BOULDER									
(MH)	STIFF, BROWN CLAYEY SILT	15		38-E	-	28	-	-	-	30/0.1'
	ROCK OR BOULDER	20		38-F	NO RECOVERY					30/0.0' HAMMER BOUNCES
	END OF BORING @ 20' 10-25-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140# Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 39 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 25 & 28, 1974

Field Party KAKU, OSHIRO, LEE, SHIGENAGA

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 248'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED	NOT NOTICED			
Time	—	—			
Date	10-25-74	10-28-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.= 248'± *	0								
(CH)	STIFF, BROWN, CLAY W/TRACES OF ROOTS			39-A	–	19	–	–	–	
(GM)	DENSE, TAN BROWN SILTY GRAVEL W/DECOMPOSED ROCK			39-B	–	14	–	–	–	44/0.3'
	COBBLE	5		39-C	NO	RECOVERY				40/0.1' HAMMER BOUNCES
(SM)	DENSE, LIGHT BROWN SILTY SAND	10		39-D	–	25	–	–	–	60/0.4' HAMMER BOUNCES
		15		39-E	–	15	–	–	–	50/0.4'
(MH)	STIFF, BROWN CLAYEY SILT W/SOME SAND	20		39-F	–	31	–	–	–	40/0.5'
	END OF BORING @ 21 10-28-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

WAIANAE RESIDENCE LOTS UNIT 2

PROJECT: HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii
Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 40 Sheet No. ____ of ____
Driller W. LUM ASSOC. INC. Date OCT. 28, 1974
Field Party SHIGENAGA, OSHIRO, LEE
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 248'± Datum —
Drill Bit T.C. DRAG

Water Level					
Time	—				
Date	10-28-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.= 248'± *	0								
(ML-CL)	STIFF, REDDISH BROWN SILTY CLAY			40-A	-	18	-	-	-	
CH	STIFF, REDDISH BROWN CLAY			40-B	25	22	64	-	-	
		5		40-C	-	16	-	-	-	40/0.2' HAMMER BOUNCES
(ML)	DENSE, BROWN SANDY SILT & LAVA ROCK (BOULDER)									
	DECOMPOSED BOULDER?	10		40-D	NO RECOVERY					40/0.2' HAMMER BOUNCES
(SM)	DENSE, BROWN SILTY SAND W/ DECOMPOSED ROCK	15		40-E	-	26	-	-	-	50/0.4' HAMMER BOUNCES
(SM)	DENSE, BROWN SILTY SAND W/TRACES OF GRAVEL	20		40-F	-	21	-	-	-	40/0.5'
	END OF BORING @ 20.3' 10-28-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES. LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 41 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: OCT. 28, 1974

Field Party: SHIGENAGA, OSHIRO, LEE

Type of Boring: AUGER (VERSA DRILL) Diam.: 4"

Elev.: 264' ± * Datum: —

Drill Bit: T.G. DRAG

Water Level					
Time	—				
Date	10-28-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
(MH-CH)	STIFF, REDDISH BROWN SILTY CLAY			41-A	—	21	—	—	—	
				41-B	—	21	—	—	—	30/0.3' HAMMER BOUNCES
		5	H	41-C	NO RECOVERY					20/0.0' HAMMER BOUNCES
	COBBLES OR BOULDERS	10	H	41-D	NO RECOVERY					20/0.0' HAMMER BOUNCES
		15	H	41-E	NO RECOVERY					10/0.0' HAMMER BOUNCES
	END OF BORING @ 15' 10-28-74									

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RES LOT PHASE II

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS UNIT 2 — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Oahu, Hawaii

Tax Map Key: 8-5-04: 12, Por. 1 & 53

HAMMER: Weight 140 # Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 42 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 29, 1974

Field Party KAKU, KAU

Type of Boring AUGER (VERSA DRILL) Diam. 4"

Elev. 272'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED			
Time	—			
Date	10-29-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV.: 272'± * 0									
(ML-CL)	STIFF, REDDISH BROWN SILTY CLAY W/ DECOMPOSED ROCK & ROOTS			42-A	—	19	—	—	—	
CH	STIFF, MOTTLED TAN BROWN CLAY W/TRACES OF ROOTS & DECOMPOSED ROCK			42-B	21	20 24	69	—	—	
		5		42-C	—	19	—	—	—	50/0.4'
SM	DENSE, TAN SILTY SAND W/TRACES OF DECOMPOSED ROCK									HAMMER BOUNCES
	COBBLES OR BOULDERS				NOTE: AT 7.0' HARD DRILLING. NO ADVANCEMENT. MOVED HOLE 5.0'					
		10								
(ML)	STIFF, BROWN SANDY SILT W/GRAVEL & DECOMPOSED ROCK			42-D	—	24	—	—	—	40/0.5'
	COBBLES OR BOULDERS									
		15		42-E	NO RECOVERY					30/0.0'
	END OF BORING @ 15' 10-29-74									HAMMER BOUNCES

* Elevation estimated from topographic and contour map by Walter P. Thompson, Inc.

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I A - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	1		2	2
SAMPLE NO.	A			A (BTM.)
DEPTH BELOW SURFACE	0.5'-2'		SURFACE	0.5'-2'
DESCRIPTION	REDDISH-BROWN CLAY		REDDISH-BROWN SILTY CLAY	BROWN CLAY
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL		NATURAL	NATURAL
Liquid Limit	46		43	84
Plastic Limit	24		26	26
Plasticity Index	22		17	58
Dilatancy	MEDIUM		MEDIUM	NONE
Toughness	MEDIUM		MEDIUM	HIGH
Dry Strength	HIGH		MEDIUM	HIGH
UNIFIED SOIL CLASSIFICATION	CL		ML-CL	CH
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %			25.0	
Molding Dry Density, P.C.F.			101.1	
Swell upon saturation, %			0.4	
CBR at 0.1" Penetration			11.7	
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I B - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	3	4	6	
SAMPLE NO.	B	C (TOP)	A	
DEPTH BELOW SURFACE	2.5'-4'	5'-6.5'	0.5'-2'	
DESCRIPTION	BROWN CLAY W/TRACES OF DECOMP. ROCK & ROOTS	DARK BROWN CLAY W/TRACES OF ROOTS & GRAVEL	REDDISH-BROWN SILTY CLAY	
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL	NATURAL	
Liquid Limit	88	63	43	
Plastic Limit	26	30	26	
Plasticity Index	62	33	17	
Dilatancy	NONE	NONE	MEDIUM	
Toughness	HIGH	HIGH	MEDIUM	
Dry Strength	HIGH	HIGH	MEDIUM	
UNIFIED SOIL CLASSIFICATION	CH	CH	ML-CL	
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %				
Molding Dry Density, P.C.F.				
Swell upon saturation, %				
CBR at 0.1" Penetration				
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I C - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	9	10	13	14
SAMPLE NO.		B		B
DEPTH BELOW SURFACE	SURFACE	2.5'-3.6'	SURFACE	2.5'-4'
DESCRIPTION	REDDISH-BROWN SILTY CLAY	DARK BROWN CLAY W/SOME DECOMP. ROCK	BROWN CLAY	BROWN CLAY
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL	NATURAL	NATURAL
Liquid Limit	42	94	48	83
Plastic Limit	25	27	26	24
Plasticity Index	17	67	22	59
Dilatancy	MEDIUM	NONE-SLOW	NONE	NONE-SLOW
Toughness	MEDIUM	HIGH	MEDIUM	HIGH
Dry Strength	MED.-HIGH	HIGH	HIGH	MED.-HIGH
UNIFIED SOIL CLASSIFICATION	CL	CH	CL	CH
APPARENT SPECIFIC GRAVITY	2.90		2.92	
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %	20.1		22.1	
Molding Dry Density, P.C.F.	103.9		101.2	
Swell upon saturation, %	2.4		3.7	
CBR at 0.1" Penetration	16.0		3.5	
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)	A		A	
Dry to Wet or Wet to Dry	DRY TO WET		DRY TO WET	
Max. Dry Density (P.C.F.)	106		106	
Optimum Moisture (%)	22		21	

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE ID - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	15	15		16
SAMPLE NO.	A	D		
DEPTH BELOW SURFACE	0.5'-2'	15'-15.5'		SURFACE
DESCRIPTION	BROWN CLAY	BROWN SILTY CLAY		DARK BROWN CLAY
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL		NATURAL
Liquid Limit	60	54		45
Plastic Limit	25	39		22
Plasticity Index	35	15		23
Dilatancy	NONE	SLOW		MEDIUM
Toughness	HIGH	MEDIUM		MED-HIGH
Dry Strength	HIGH	MEDIUM		HIGH
UNIFIED SOIL CLASSIFICATION	CH	MH-CH		CL
APPARENT SPECIFIC GRAVITY				2.75
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %				20.0
Molding Dry Density, P.C.F.				103.6
Swell upon saturation, %				2.9
CBR at 0.1" Penetration				5.0
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				A
Dry to Wet or Wet to Dry				DRY TO WET
Max. Dry Density (P.C.F.)				104
Optimum Moisture (%)				21

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

NAIANAE RESIDENCE LOTS - UNIT 2

TABLE IE - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	17		19	19
SAMPLE NO.	A			B
DEPTH BELOW SURFACE	0.5'-2'		SURFACE	2.5'-3.5'
DESCRIPTION	BROWN CLAY W/TRACES OF ROOTS		LIGHT BROWN CLAY W/TRACES OF ROOTS	BROWN CLAY W/TRACES OF ROOTS
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL		NATURAL	NATURAL
Liquid Limit	82		64	62
Plastic Limit	24		31	23
Plasticity Index	58		33	39
Dilatancy	SLOW		MEDIUM	SLOW
Toughness	HIGH		MED.-HIGH	HIGH
Dry Strength	HIGH		HIGH	HIGH
UNIFIED SOIL CLASSIFICATION	CH		CH	CH
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %			24.8	
Molding Dry Density, P.C.F.			91.7	
Swell upon saturation, %			4.1	
CBR at 0.1" Penetration			4.9	
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I F - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	22 *	22 *		23 *
SAMPLE NO.	A	B		
DEPTH BELOW SURFACE	1.5'±	4'±		SURFACE
DESCRIPTION	DARK BROWN CLAY W/SOME COBBLES	TAN BROWN SAND & GRAVEL W/COBBLES & DECOMP. ROCK		DARK BROWN CLAY
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"		100		
1/2"		53.3		
#4		35.0		
#10		22.5		
#20		13.0		
#40		7.3		
#100		2.3		
#200		1.2		
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL			NATURAL
Liquid Limit	73			74
Plastic Limit	22			24
Plasticity Index	51			50
Dilatancy	NONE			NONE
Toughness	HIGH			HIGH
Dry Strength	HIGH			HIGH
UNIFIED SOIL CLASSIFICATION	CH	GW		CH
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %				19.4
Molding Dry Density, P.C.F.				111.6
Swell upon saturation, %				11.7
CBR at 0.1" Penetration				1.0
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

* - OPEN PITS

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I G - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	24 *	24 *	26 *	27 *
SAMPLE NO.	B	C	B	C
DEPTH BELOW SURFACE	4'±	7'±	2.5'±	7'±
DESCRIPTION	BROWN CLAY W/GYPSUM	BROWN CLAYEY SILT W/SOME COBBLES	BROWN & TAN SAND W/GRAVEL (SOME CEMENTATION)	TAN-BROWN SILTY SAND W/GRAVEL, COBBLES & DECOMP. ROCK
GRAIN-SIZE ANALYSIS (% Passing)				
Sieve 1½"			100	100
1"			84.5	88.8
1/2"			84.5	72.6
#4			80.8	63.4
#10			62.6	55.4
#20			33.4	47.1
#40			20.9	39.0
#100			11.0	22.1
#200			6.9	15.2
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL		
Liquid Limit	87	59		
Plastic Limit	26	28		
Plasticity Index	61	31		
Dilatancy	NONE	NONE-SLOW		
Toughness	HIGH	HIGH		
Dry Strength	HIGH	HIGH		
UNIFIED SOIL CLASSIFICATION	CH	CH	SW-SM	SM
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %				
Molding Dry Density, P.C.F.				
Swell upon saturation, %				
CBR at 0.1" Penetration				
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

* - OPEN PITS

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I H - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	29	29	31	31
SAMPLE NO.		A	A	B
DEPTH BELOW SURFACE	SURFACE	0.5'-2'	0.5'-2'	2.5'-4'
DESCRIPTION	DARK BROWN CLAY	DARK BROWN CLAY W/TRACES OF GRAVEL & ROOTS	DARK BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS	BROWN SILTY SAND
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				100
1/2"				100
#4				99.4
#10				96.2
#20				89.9
#40				77.6
#100				49.2
#200				36.3
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL	NATURAL	
Liquid Limit	64	68	68	
Plastic Limit	28	25	24	
Plasticity Index	36	43	44	
Dilatancy	NONE	SLOW	NONE	
Toughness	MED-HIGH	HIGH	HIGH	
Dry Strength	HIGH	HIGH	HIGH	
UNIFIED SOIL CLASSIFICATION	CH	CH	CH	SM
APPARENT SPECIFIC GRAVITY				
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %	21.0			
Molding Dry Density, P.C.F.	101.3			
Swell upon saturation, %	6.1			
CBR at 0.1" Penetration	3.7			
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	33	34	35	36
SAMPLE NO.		C	A	B
DEPTH BELOW SURFACE	SURFACE	10'-11.5'	0.5'-2'	2.5'-4'
DESCRIPTION	DARK BROWN CLAY	BROWN CLAYEY SILT W/TRACES OF SAND	BROWN CLAY W/TRACES OF GRAVEL & ROOTS	BROWN CLAY W/TRACES OF ROOTS
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL	NATURAL	NATURAL
Liquid Limit	55	53	74	59
Plastic Limit	25	37	23	24
Plasticity Index	30	16	51	35
Dilatancy	NONE	MEDIUM	SLOW	NONE-SLOW
Toughness	HIGH	MEDIUM	MED.-HIGH	HIGH
Dry Strength	HIGH	MEDIUM	HIGH	HIGH
UNIFIED SOIL CLASSIFICATION	CH	MH	CH	CH
APPARENT SPECIFIC GRAVITY	2.89			
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %	23.3			
Molding Dry Density, P.C.F.	102.6			
Swell upon saturation, %	2.8			
CBR at 0.1" Penetration	2.5			
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)	A			
Dry to Wet or Wet to Dry	DRY TO WET			
Max. Dry Density (P.C.F.)	105			
Optimum Moisture (%)	22			

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT

3-1273

WAIANAE RESIDENCE LOTS - UNIT 2

TABLE I K - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	38	38	40	42
SAMPLE NO.		B	B	B (BTM.)
DEPTH BELOW SURFACE	SURFACE	2.5'-3.5'	2.5'-4'	2.5'-4'
DESCRIPTION	BROWN CLAY	MOTTLED BROWN CLAY W/TRACES OF DECOMPOSED ROCK & ROOTS	REDDISH-BROWN CLAY	MOTTLED TAN BROWN CLAY W/TRACES OF DECOMP. ROCK & ROOTS
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL	NATURAL	NATURAL	NATURAL
Liquid Limit	51	87	64	69
Plastic Limit	26	27	25	21
Plasticity Index	25	60	39	48
Dilatancy	MEDIUM	NONE	NONE	NONE
Toughness	MEDIUM	HIGH	HIGH	HIGH
Dry Strength	HIGH	HIGH	HIGH	MED.-HIGH
UNIFIED SOIL CLASSIFICATION	CH	CH	CH	CH
APPARENT SPECIFIC GRAVITY	2.90			
CBR TEST (Surcharge-51 P.S.F.)				
Molding Moisture, %	22.5			
Molding Dry Density, P.C.F.	102.8			
Swell upon saturation, %	3.3			
CBR at 0.1" Penetration	6.2			
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___)	A			
Dry to Wet or Wet to Dry	DRY TO WET			
Max. Dry Density (P.C.F.)	102			
Optimum Moisture (%)	24			

REMARKS:

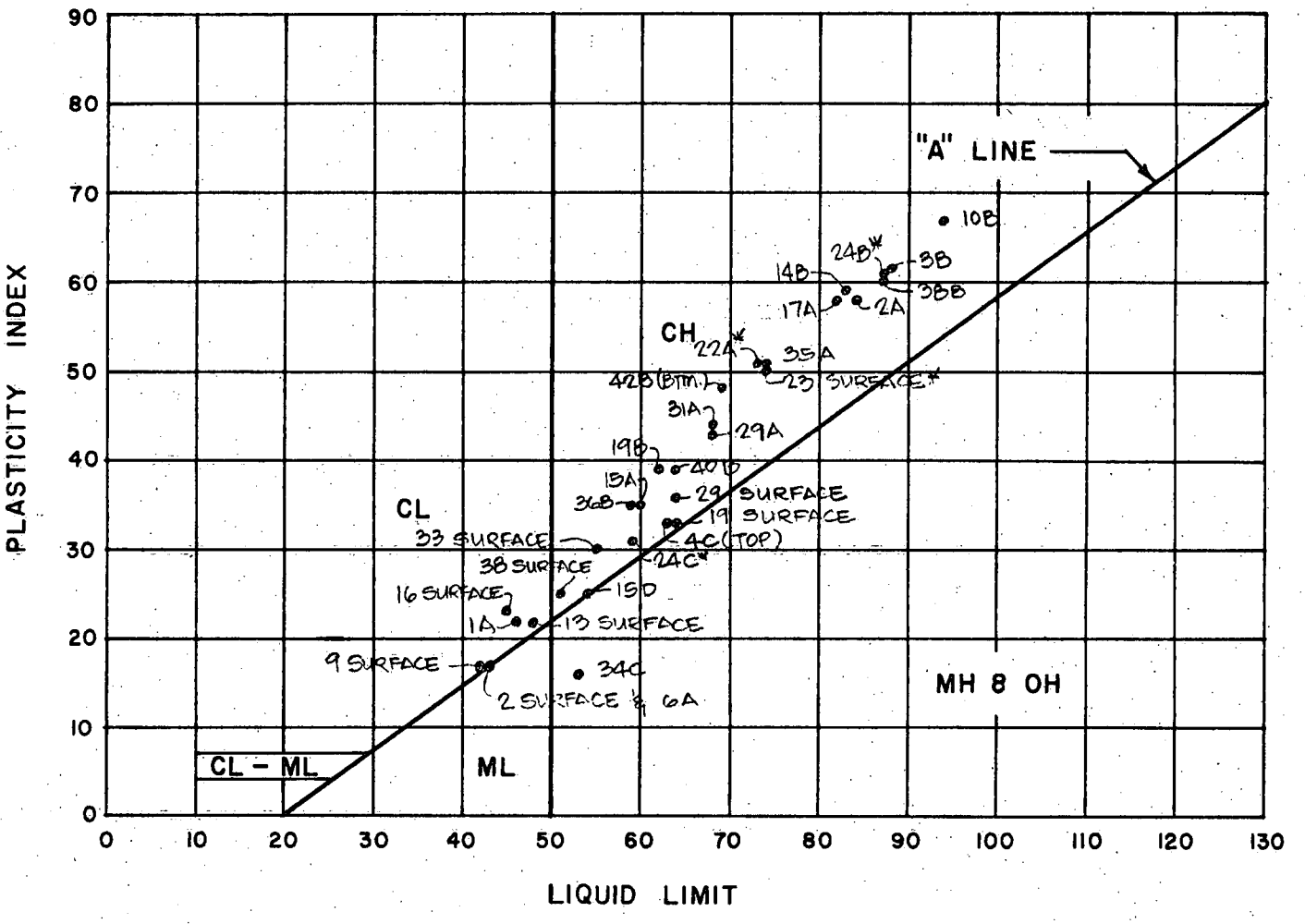
WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-17-75 By BT.

PLASTICITY CHART

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII



* - OPEN PIT SAMPLES

DATE 1-17-75 BY PJT

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

MOISTURE–DENSITY CURVE (AASHO T-180-73I, METHOD A)

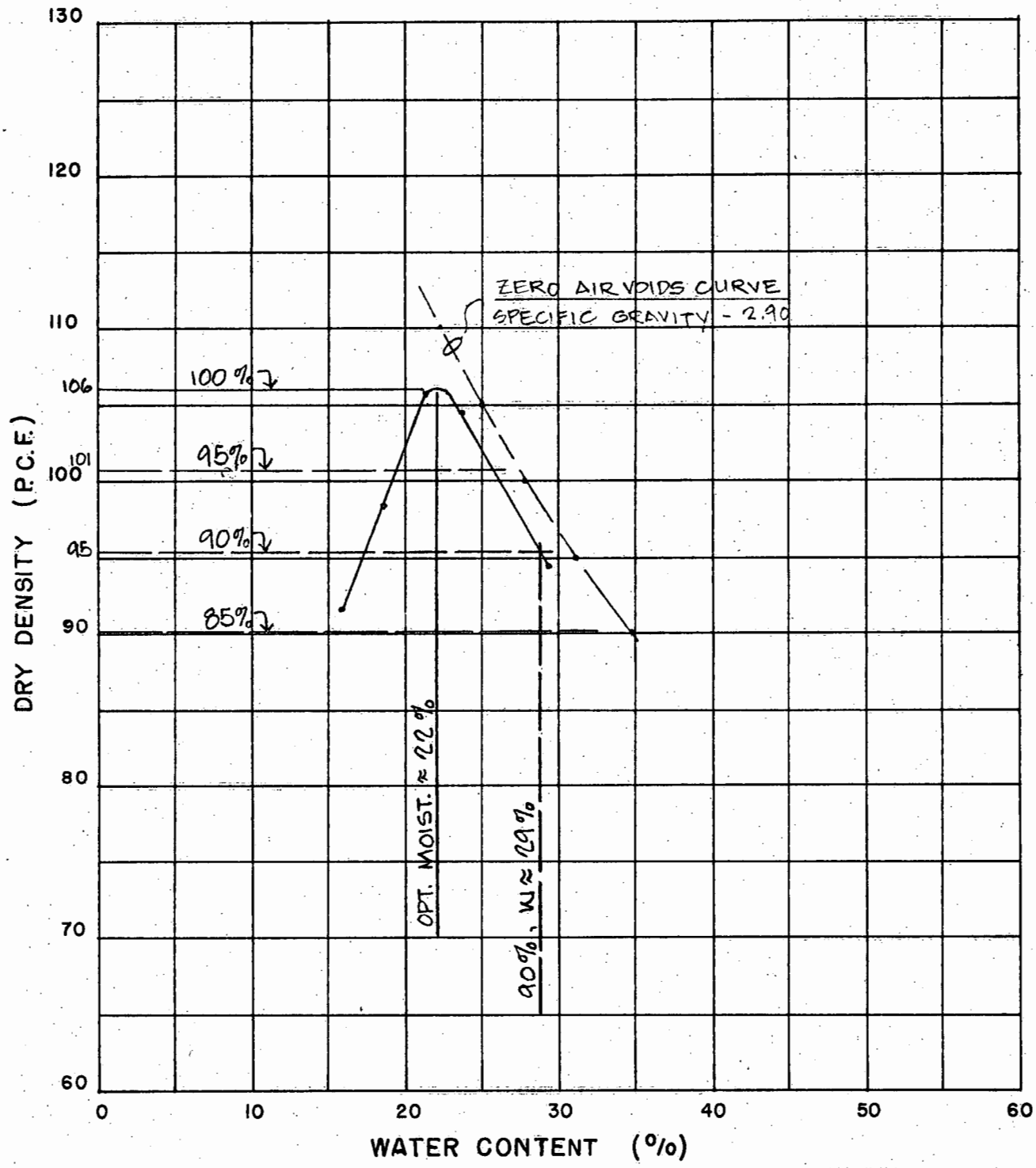
PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO.: 9 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4" Φ X 4.584" HIGH
HAMMER: 10 LBS. 18" DROP
LAYERS: 5
BLOWS: 25/LAYER



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 10-28-74 BY N.I.

MOISTURE–DENSITY CURVE (AASHO T-180-73I, METHOD A)

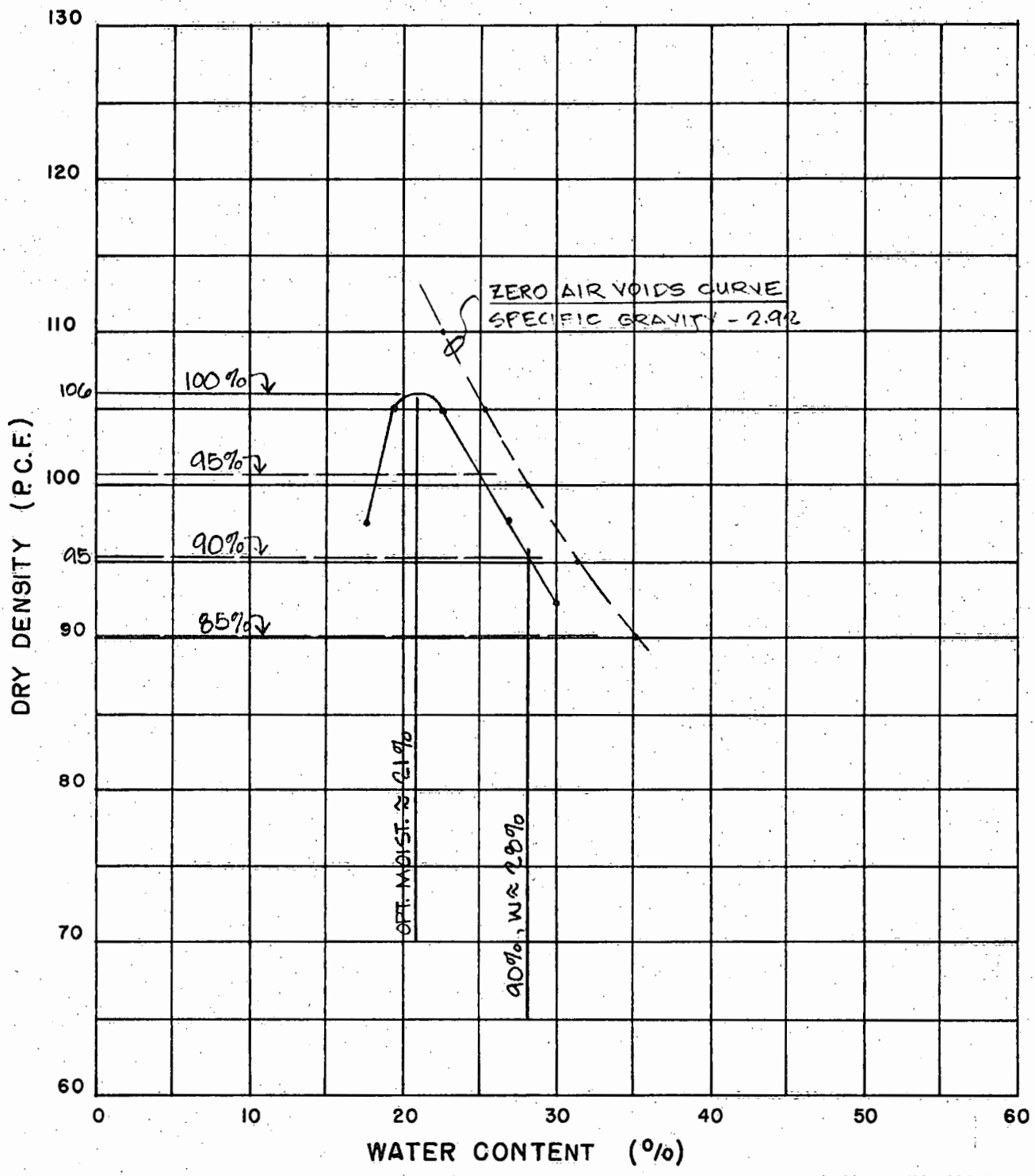
PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO.: 13 SURFACE

SAMPLE DESCRIPTION: BROWN CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4"ϕX4.584"HIGH
HAMMER: 10 LBS. 18"DROP
LAYERS: 5
BLOWS: 25/LAYER



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 10-25-74 BY N.I.

MOISTURE–DENSITY CURVE (AASHO T-180-73I, METHOD A)

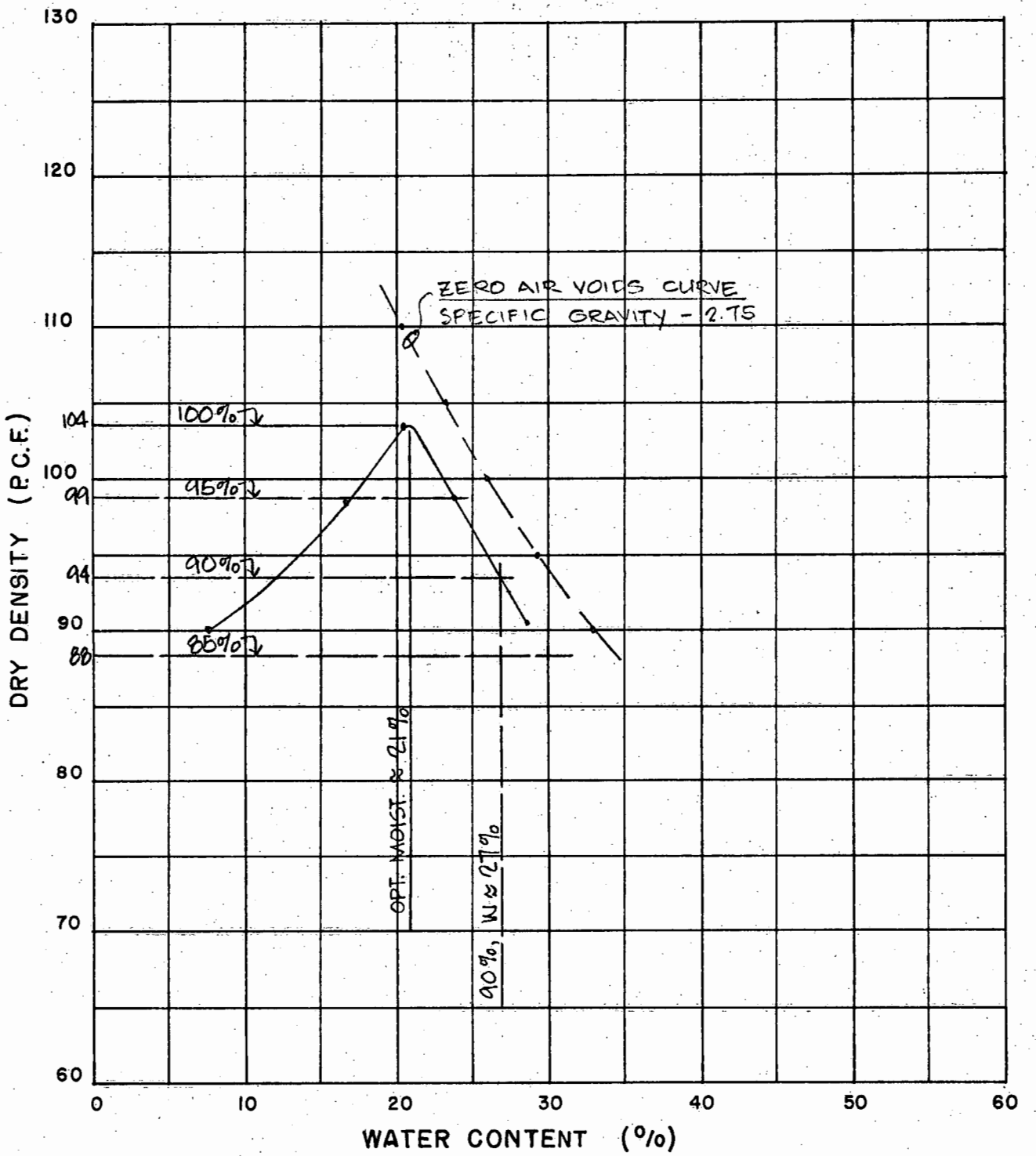
PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO.: 16 SURFACE

SAMPLE DESCRIPTION: DARK BROWN CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4"ϕ X 4.584" HIGH
HAMMER: 10 LBS. 18" DROP
LAYERS: 5
BLOWS: 25/LAYER



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 11-5-74 BY N.I.

9-470

MOISTURE-DENSITY CURVE (AASHO T-180-73I, METHOD A)

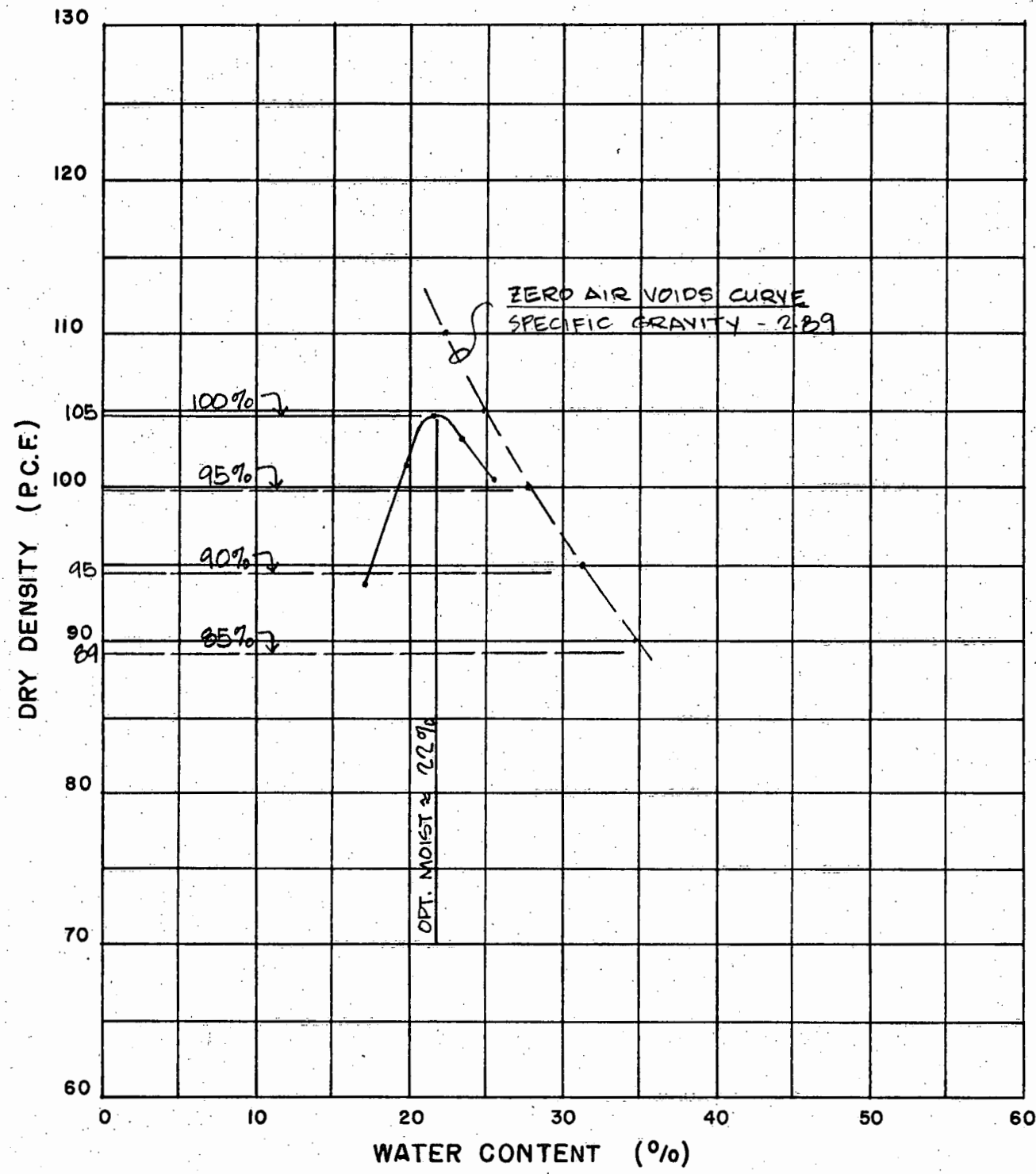
PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO.: 33 SURFACE

SAMPLE DESCRIPTION: DARK BROWN CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4"ΦX4.584" HIGH
HAMMER: 10 LBS, 18" DROP
LAYERS: 5
BLOWS: 56/LAYER



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 10-22-74 BY N.I.

MOISTURE–DENSITY CURVE (AASHO T-180-73I, METHOD A)

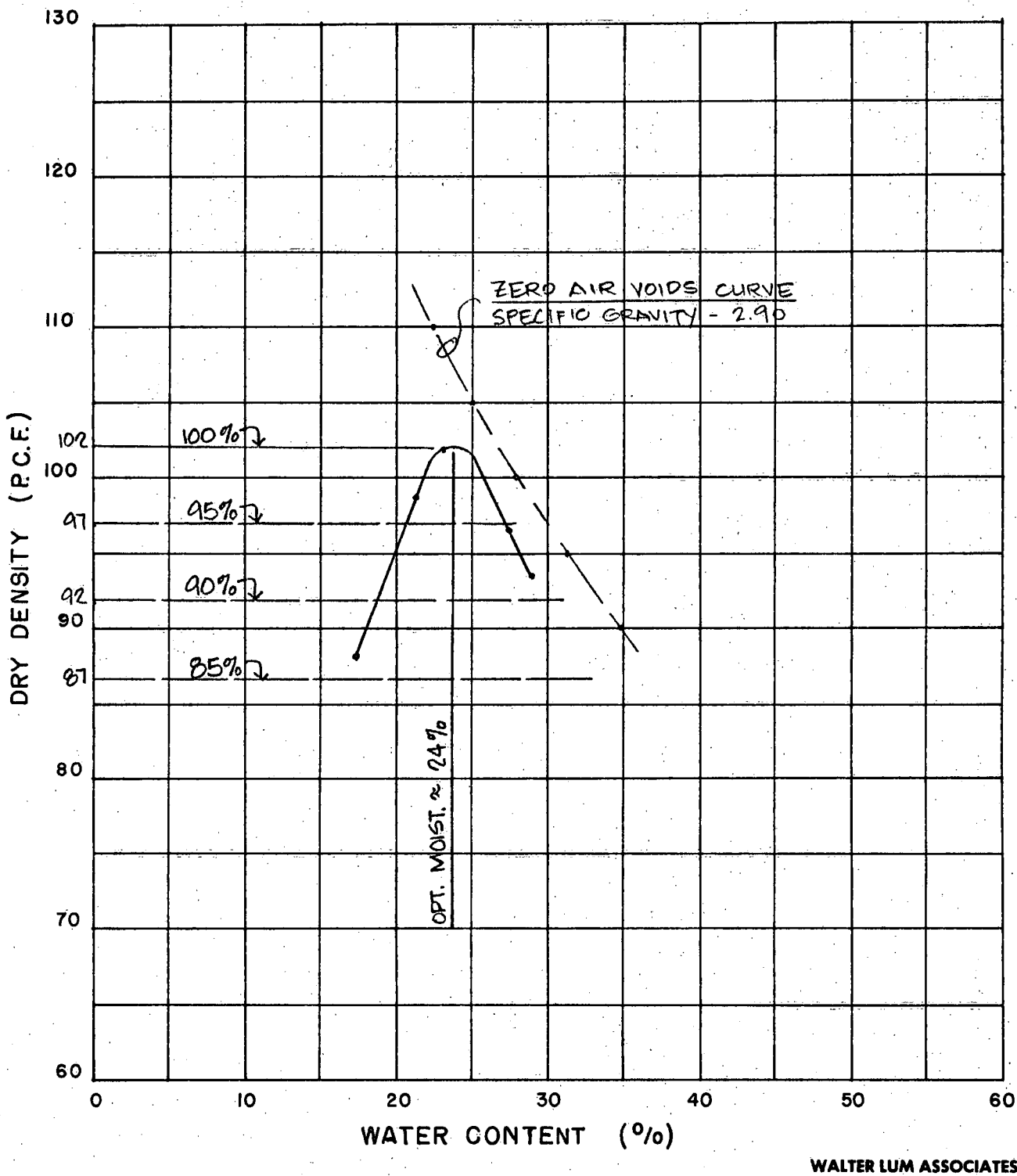
PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO.: 3B SURFACE

SAMPLE DESCRIPTION: BROWN CLAY

AGGREGATE: 1/4" MINUS
MOLD SIZE: 4"ϕ X 4.584" HIGH
HAMMER: 10 LBS. 18" DROP
LAYERS: 5
BLOWS: 25/LAYER



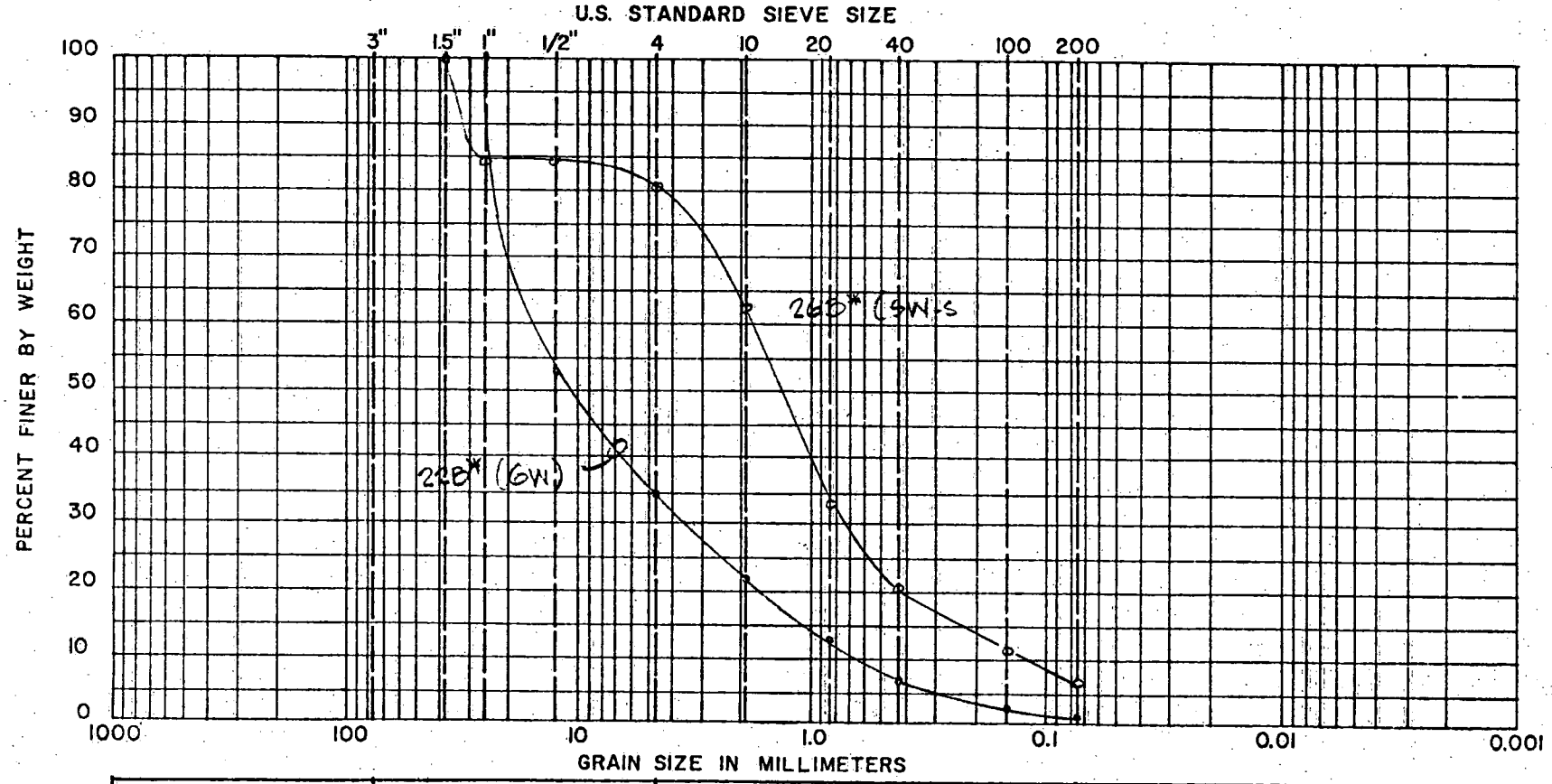
WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 10-29-74 BY N.I.

GRAIN-SIZE ANALYSIS CURVE

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII



COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

DATE 1-17-75 BY MT

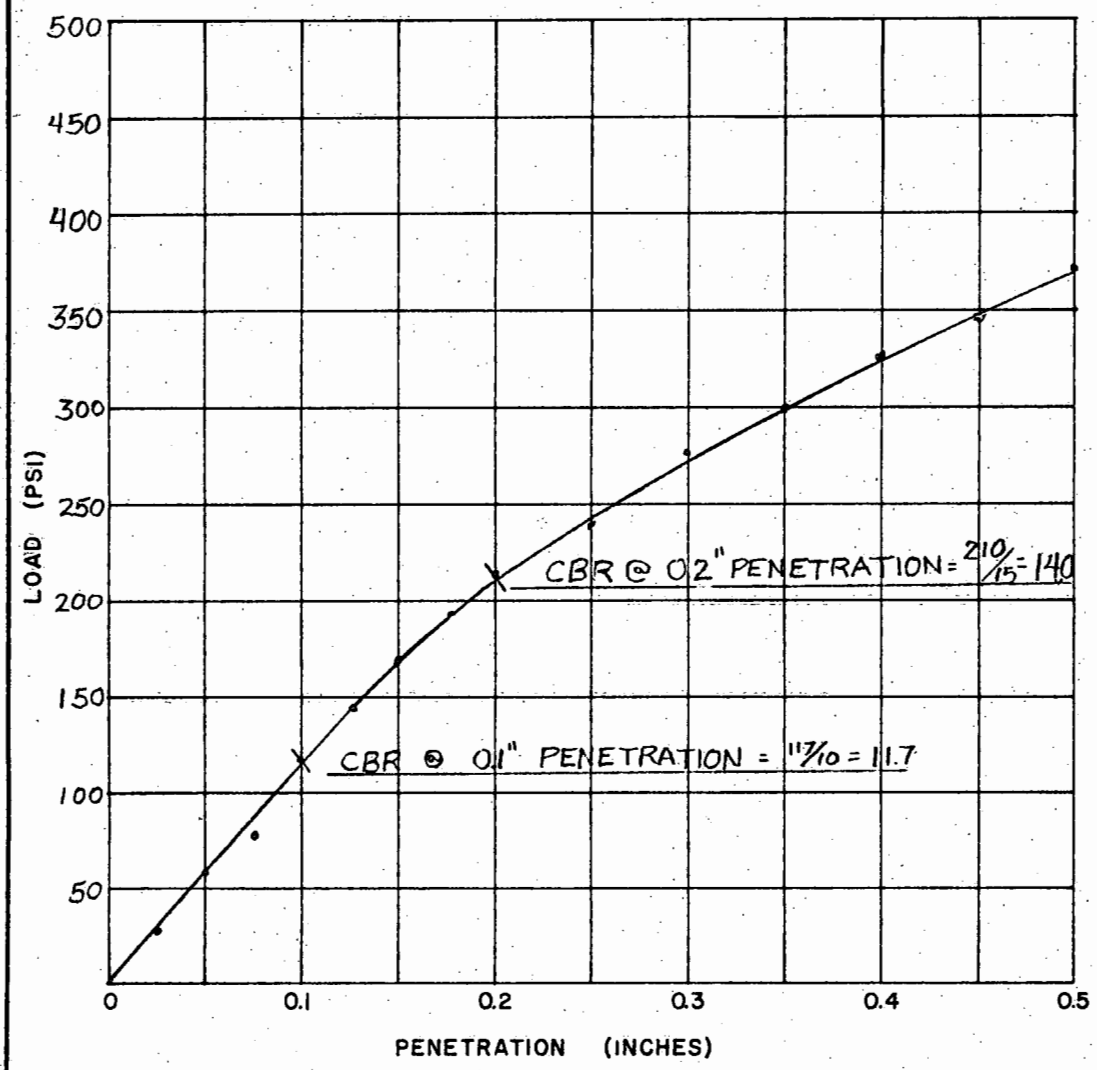
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 2 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	80	27
0.050	170	57
0.075	260	87
0.100	350	117
0.125	430	143
0.150	510	170
0.175	580	193
0.200	640	213
0.250	720	240
0.300	830	277
0.350	900	300
0.400	980	327
0.450	1040	347
0.500	1120	373

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYERS

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 25.0

MOLDING DRY DENSITY, P.C.F. 101.1

CBR @ 0.1" PENETRATION 11.7

DAYS SOAKED 4

DATE 11-2-74 BY ML

DATE 11-4-74 BY RH

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

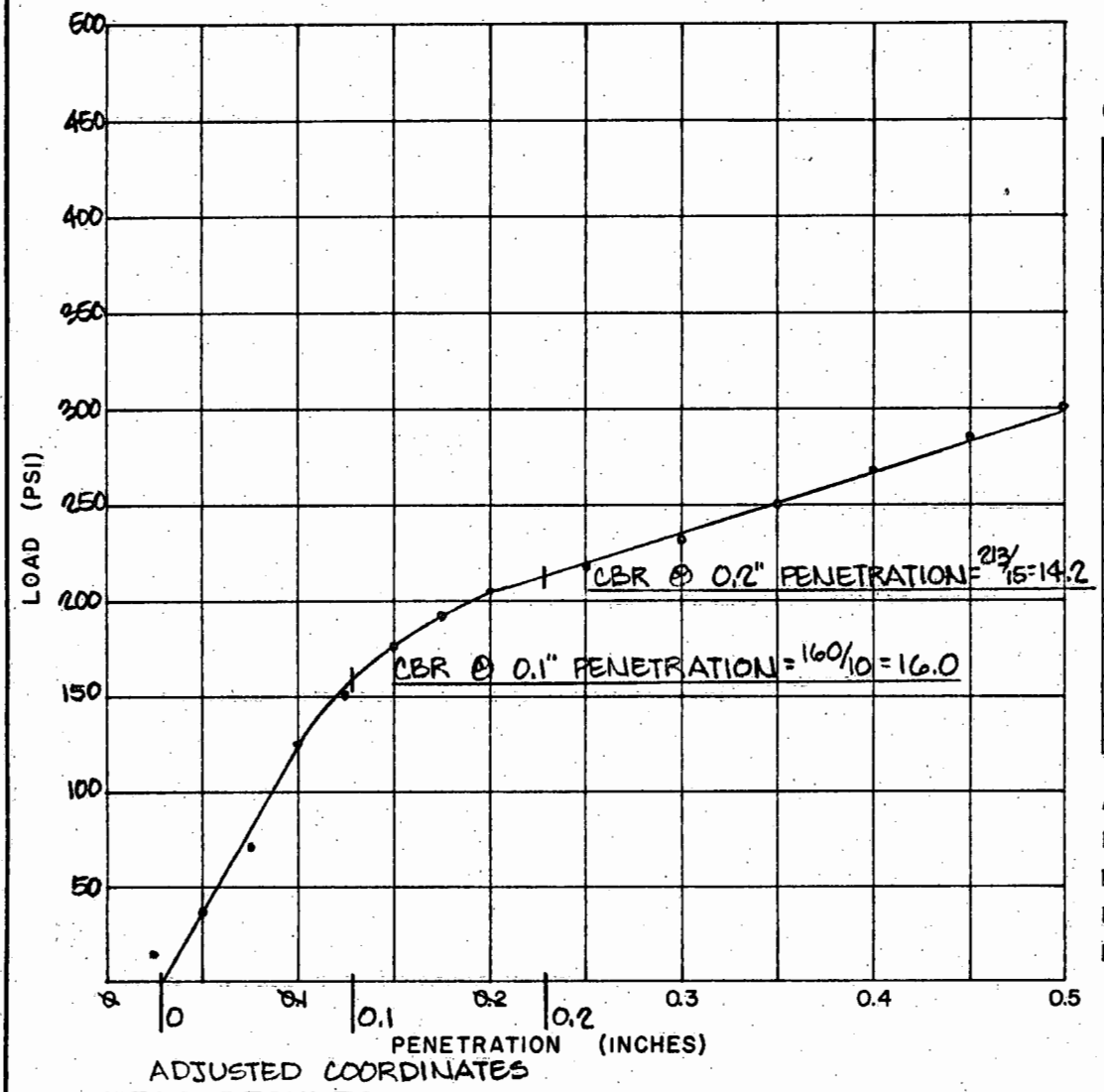
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 9 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY



ADJUSTED COORDINATES

CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	44	15
0.050	113	38
0.075	216	72
0.100	376	125
0.125	449	150
0.150	529	176
0.175	577	192
0.200	613	204
0.250	651	217
0.300	694	231
0.350	751	250
0.400	800	267
0.450	852	284
0.500	904	301

AGGREGATE 1/4" MINUS
HAMMER WEIGHT 10 LBS.
HAMMER DROP 18 INS.
No. OF BLOWS 56/LAYER
No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 20.1
MOLDING DRY DENSITY, P.C.F. 1039
CBR @ 0.1" PENETRATION 16.0
DAYS SOAKED 4

DATE 10-28-74 BY C.H.
DATE 10-29-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

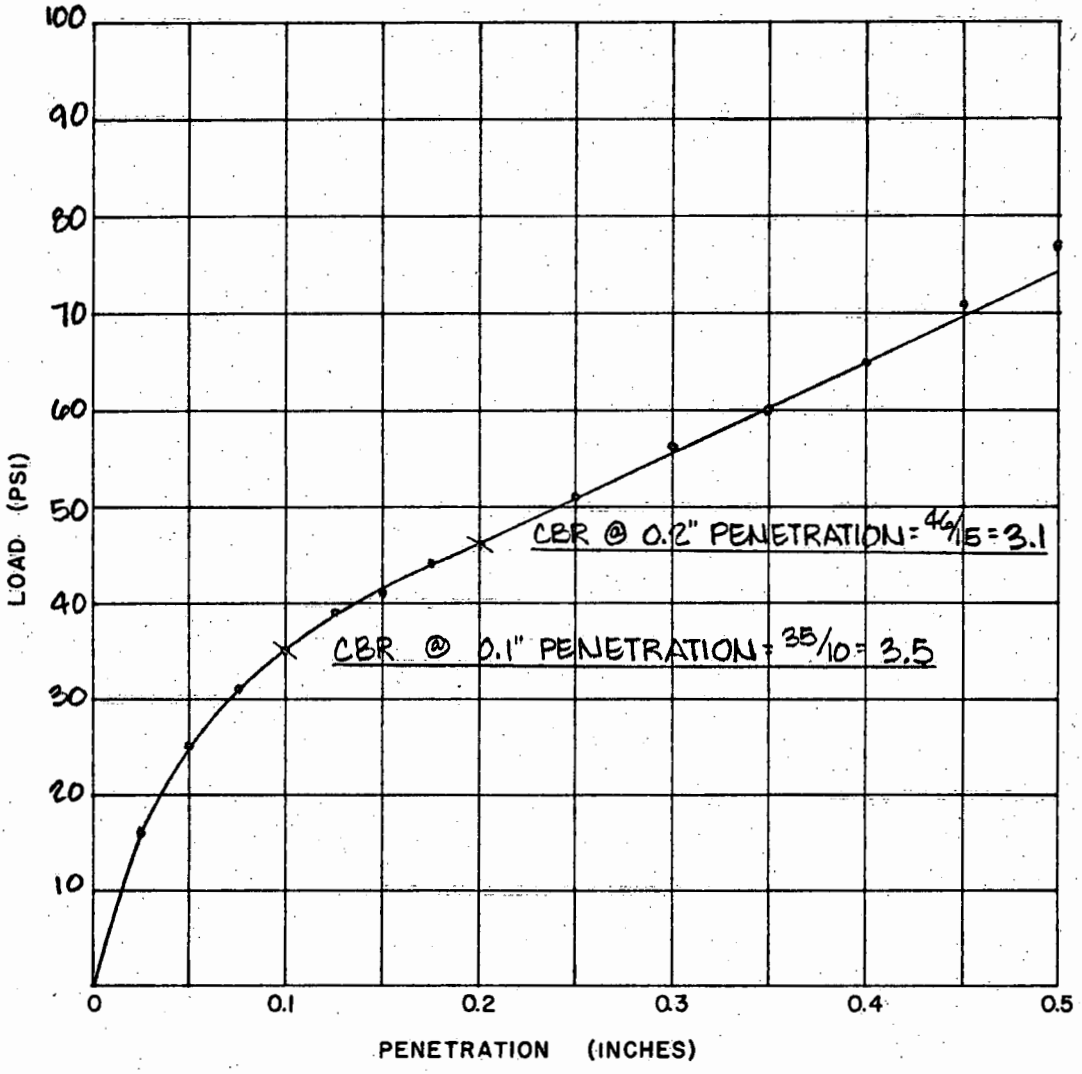
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 13 SURFACE

SAMPLE DESCRIPTION: BROWN CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	48	16
0.050	75	25
0.075	92	31
0.100	105	35
0.125	116	39
0.150	124	41
0.175	131	44
0.200	138	46
0.250	154	51
0.300	167	56
0.350	180	60
0.400	195	65
0.450	214	71
0.500	231	77

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 22.1

MOLDING DRY DENSITY, P.C.F. 101.2

CBR @ 0.1" PENETRATION 3.5

DAYS SOAKED 4

DATE 10-29-74 BY H.C.

DATE 10-30-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

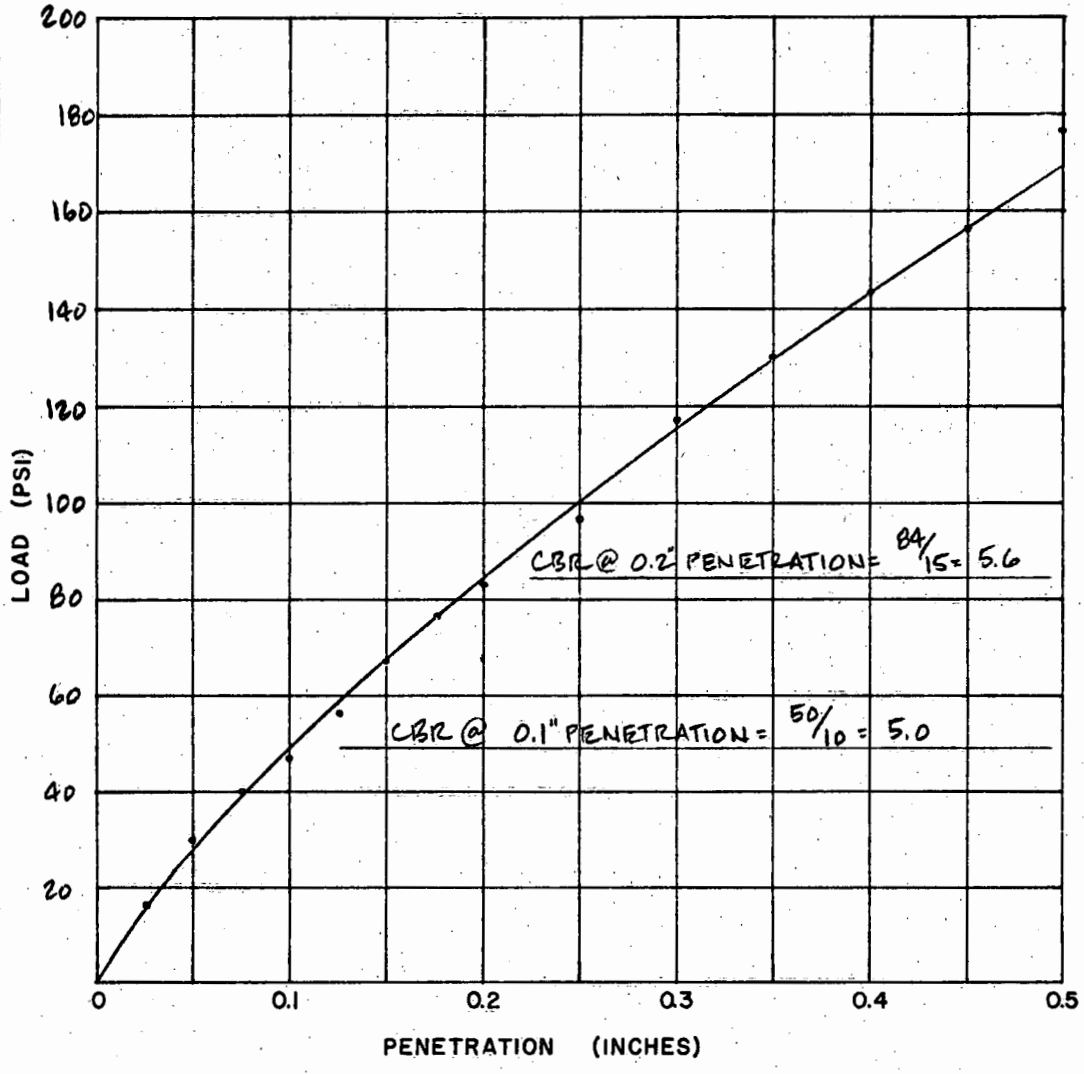
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 16 SURFACE

SAMPLE DESCRIPTION: REDDISH-BROWN SILTY CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	50	17
0.050	90	30
0.075	120	40
0.100	140	47
0.125	170	57
0.150	200	67
0.175	230	77
0.200	250	83
0.250	290	97
0.300	350	117
0.350	390	130
0.400	430	143
0.450	470	157
0.500	530	177

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18"

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 20.0

MOLDING DRY DENSITY, P.C.F. 103.6

CBR @ 0.1" PENETRATION 5.0

DAYS SOAKED 4

DATE 11-9-74 BY GS

DATE 11-11-74 BY CH

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

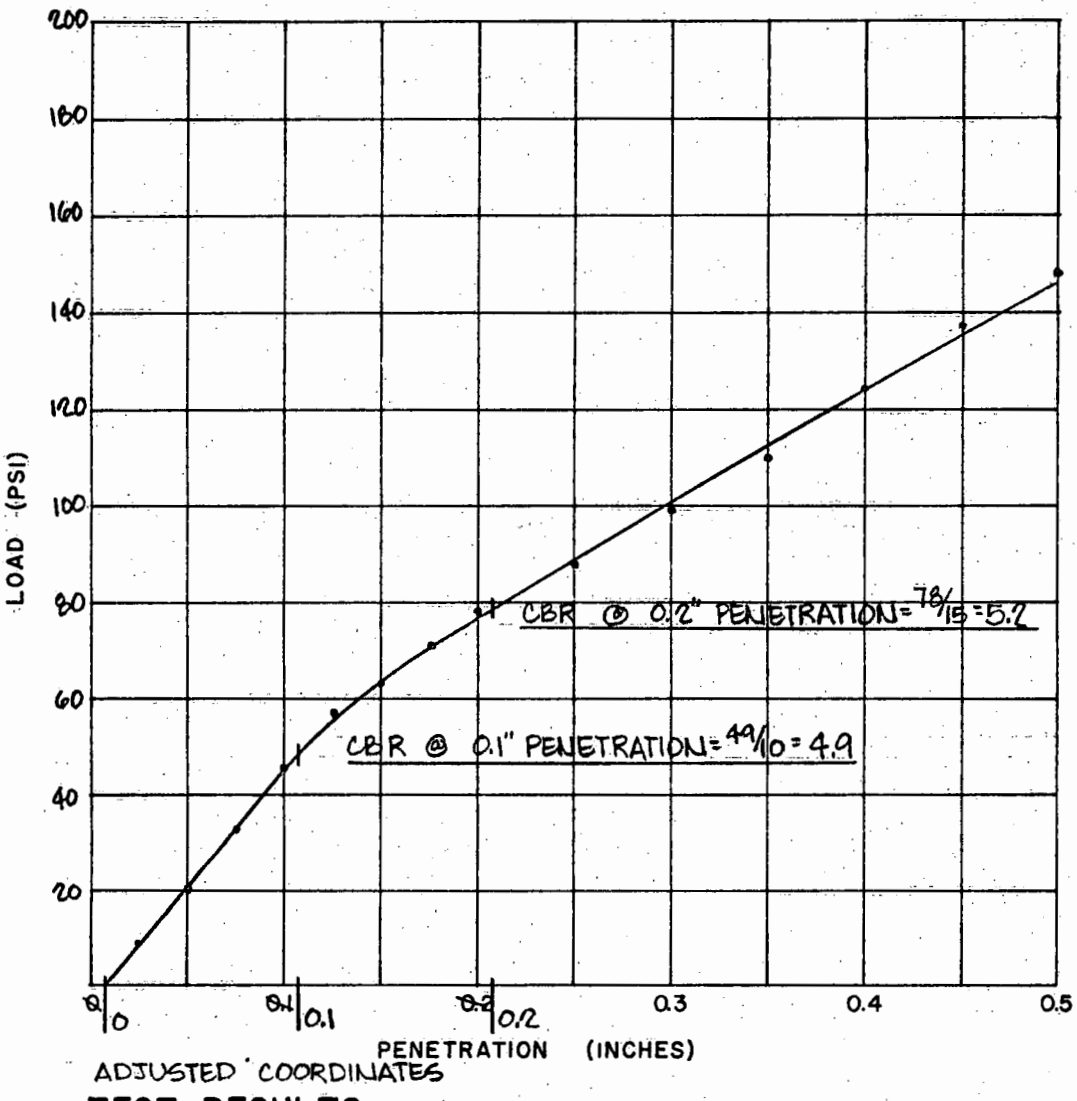
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 19 SURFACE

SAMPLE DESCRIPTION: LIGHT BROWN CLAY W/TRACES OF ROOTS



ADJUSTED COORDINATES

CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	28	9
0.050	60	20
0.075	100	33
0.100	139	46
0.125	170	57
0.150	189	63
0.175	214	71
0.200	234	78
0.250	265	88
0.300	297	99
0.350	330	110
0.400	373	124
0.450	411	137
0.500	473	158

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 24.8

MOLDING DRY DENSITY, P.C.F. 91.7

CBR @ 0.1" PENETRATION 4.9

DAYS SOAKED 4

DATE 11-8-74 BY C.L.

DATE 11-11-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

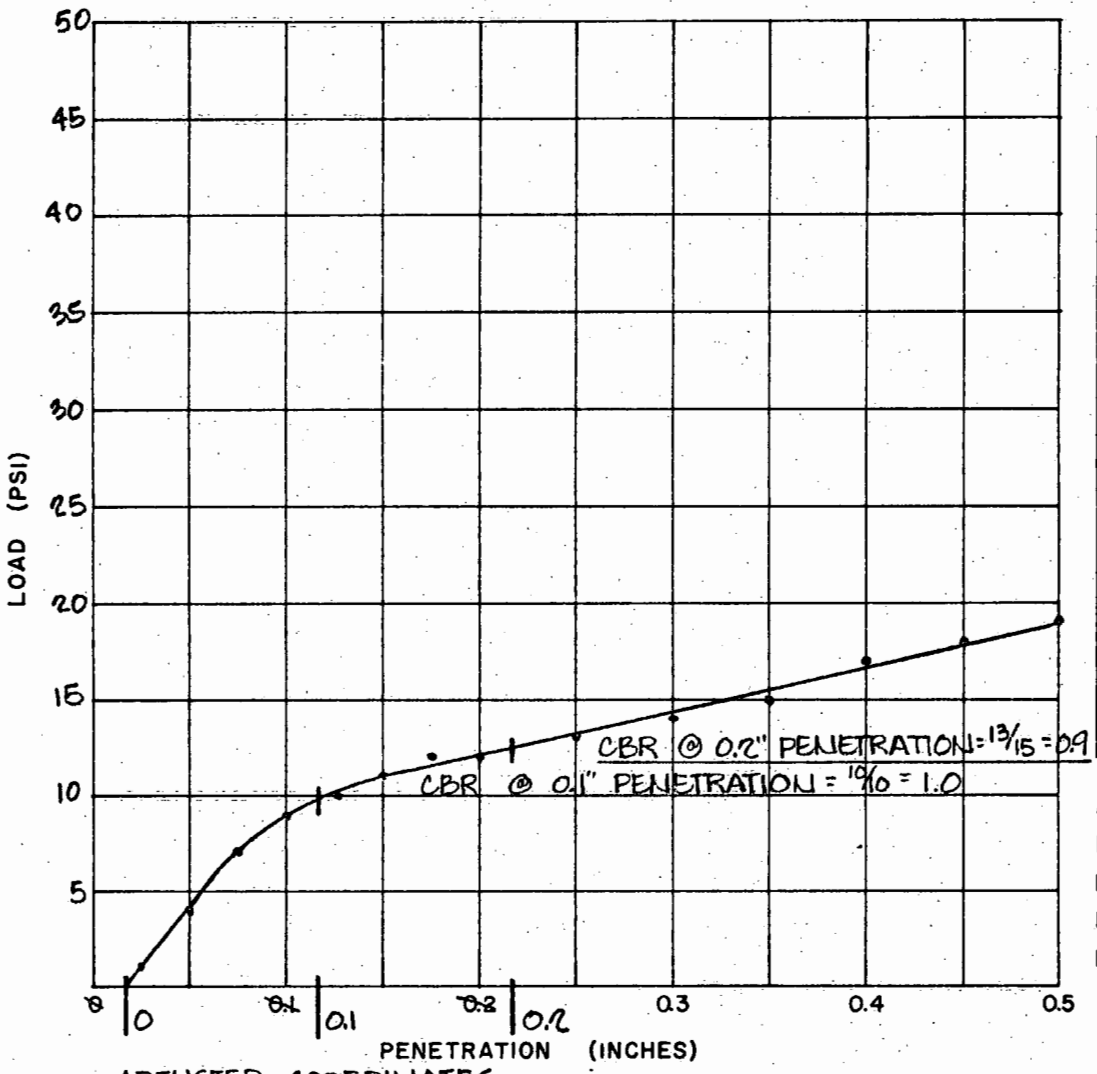
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 2? SURFACE

SAMPLE DESCRIPTION: DARK BROWN CLAY



ADJUSTED COORDINATES

CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	3	1
0.050	13	4
0.075	22	7
0.100	27	9
0.125	31	10
0.150	34	11
0.175	36	12
0.200	37	12
0.250	40	13
0.300	43	14
0.350	46	15
0.400	50	17
0.450	53	18
0.500	56	19

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 19.4

MOLDING DRY DENSITY, P.C.F. 111.6

CBR @ 0.1" PENETRATION 1.0

DAYS SOAKED 4

DATE 1-15-75 BY L.Y.

DATE 1-15-75 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

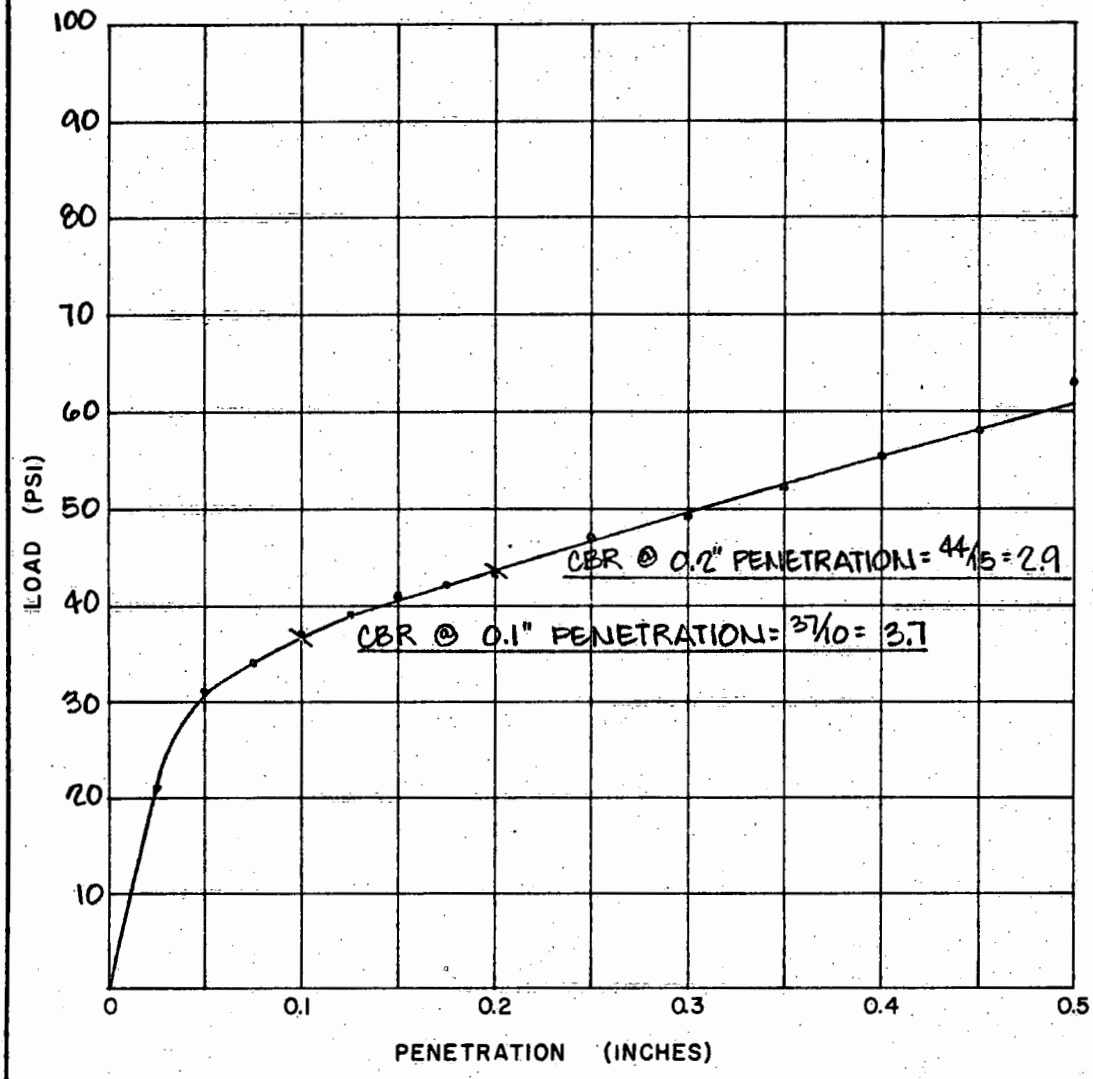
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 29 SURFACE

SAMPLE DESCRIPTION: DARK BROWN CLAY W/TRACES OF GRAVEL & ROOTS



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	64	21
0.050	94	31
0.075	103	34
0.100	111	37
0.125	117	39
0.150	122	41
0.175	126	42
0.200	130	43
0.250	140	47
0.300	148	49
0.350	157	52
0.400	165	55
0.450	175	58
0.500	189	63

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 21.0

MOLDING DRY DENSITY, P.C.F. 101.3

CBR @ 0.1" PENETRATION 3.7

DAYS SOAKED 5

DATE 10-28-74 BY H.C.

DATE 10-29-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

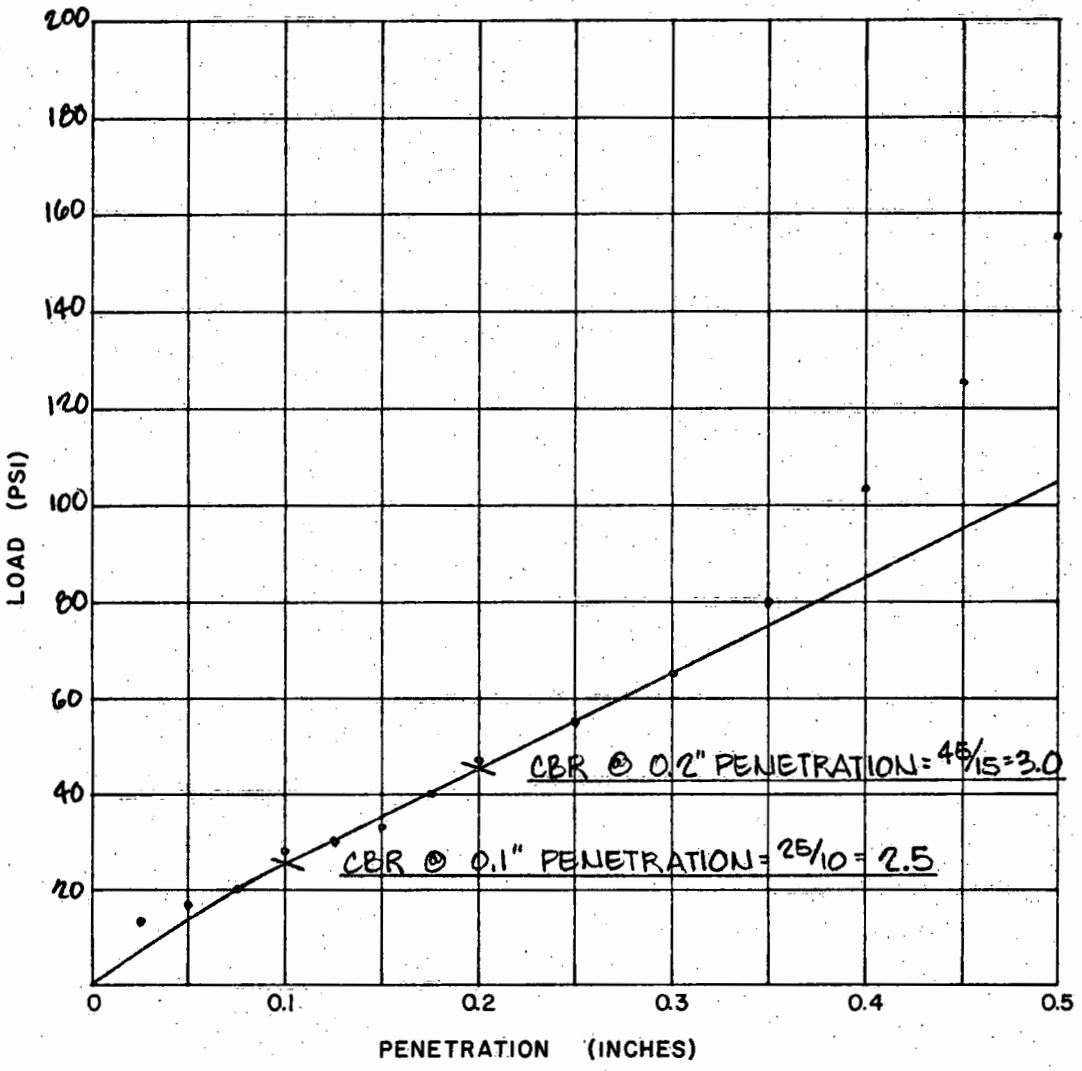
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 33 SURFACE

SAMPLE DESCRIPTION: DARK BROWN CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	40	13
0.050	50	17
0.075	60	20
0.100	85	28
0.125	90	30
0.150	100	33
0.175	120	40
0.200	140	47
0.250	165	55
0.300	195	65
0.350	240	80
0.400	310	103
0.450	375	125
0.500	465	155

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 23.3

MOLDING DRY DENSITY, P.C.F. 102.6

CBR @ 0.1" PENETRATION 2.5

DAYS SOAKED 4

DATE 10-25-74 BY H.S.

DATE 10-28-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

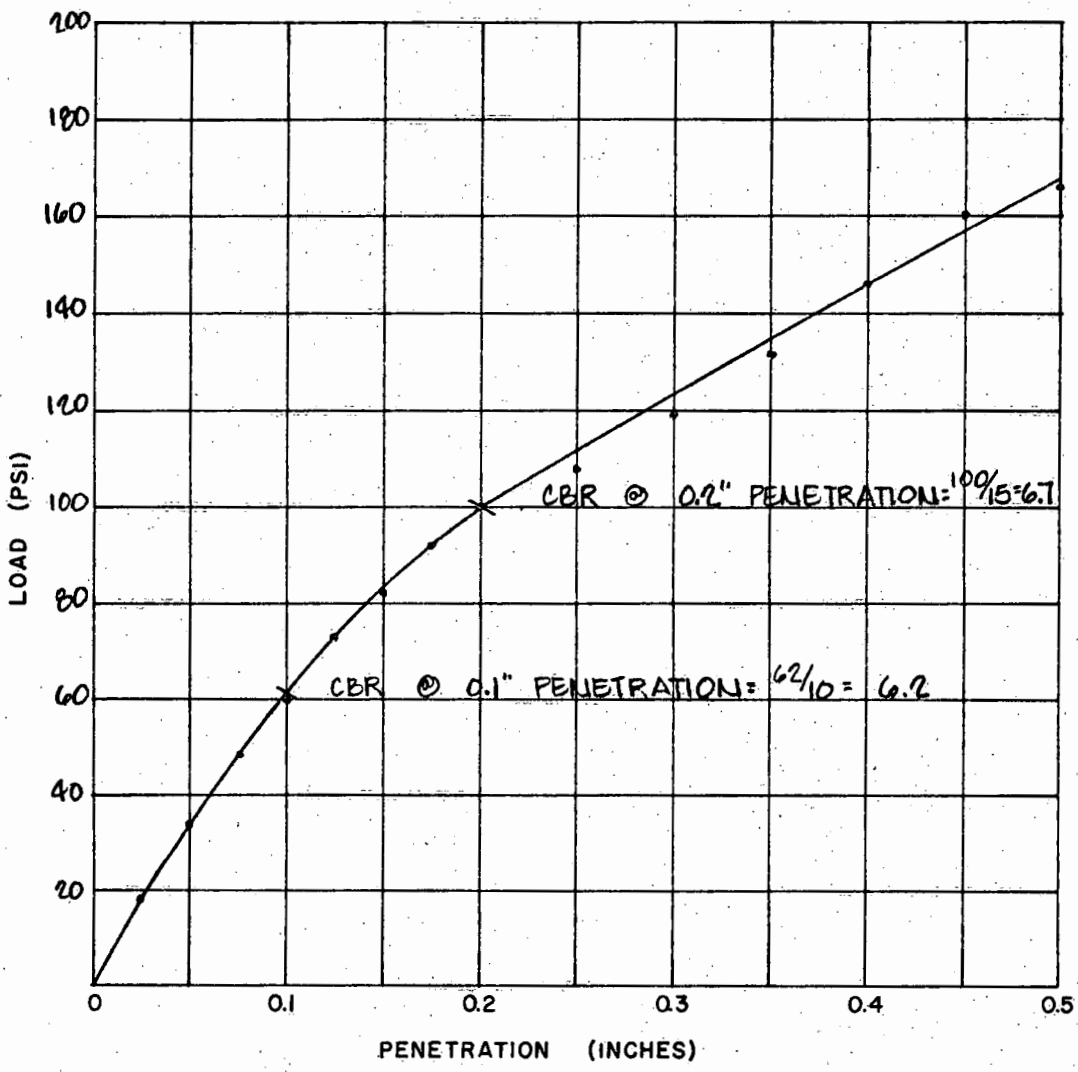
CBR TEST

PROJECT: WAIANAE RESIDENCE LOTS - UNIT 2

LOCATION: WAIANAE VALLEY, WAIANAE, OAHU, HAWAII

SAMPLE NO: 33 SURFACE

SAMPLE DESCRIPTION: BROWN CLAY



CBR PENETRATION DATA

PENETRATION (INCHES)	LOAD (LBS.)	LOAD (PSI)
0.025	55	18
0.050	101	34
0.075	143	48
0.100	181	60
0.125	218	73
0.150	247	82
0.175	275	92
0.200	299	100
0.250	323	108
0.300	357	119
0.350	394	131
0.400	438	146
0.450	479	160
0.500	498	166

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS.

HAMMER DROP 18 INS.

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

TEST RESULTS:

MOLDING MOISTURE, %. 22.5

MOLDING DRY DENSITY, P.C.F. 102.8

CBR @ 0.1" PENETRATION 6.2

DAYS SOAKED 4

DATE 11-1-74 BY H.C.

DATE 11-4-74 BY N.I.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

LOGS OF BORINGS

FROM

"WAIANAE RESIDENCE LOTS - UNIT I

HAWAIIAN HOME LANDS"

REPORT DATED JULY 5, 1974

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS - UNIT I, HAWAIIAN HOME LANDS
LOCATION: Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: Por. 53

BORING NO. 2 Sheet No. ____ of ____
Driller: W. LUM ASSOC. INC. Date: MAY 30 & 31, 1974
Field Party: KAKU, RADOVICH
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 133'± * Datum: —
Drill Bit: T.C. DRAG

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" STANDARD SPLIT SPOON

Water Level	NOT NOTICED	NOT NOTICED			
Time	—	—			
Date	5-30-74	5-31-74			

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
		ELEV. = 133'± *	0								
	0.7 - 5.0' 20 MIN.	COBBLE OR BOULDER			2-A	ROCK FRAGMENTS					40/0.2'
(GM)		DENSE, GRAY-BROWN GRAVEL W/TRACES OF MOTTLED BROWN, SILTY SAND	5		2-B	—	8	—	—	—	79
	5.5'-10.0' 35 MIN.	COBBLES OR BOULDERS									
		DENSE, MOTTLED BROWN SILTY SAND & DECOMPOSED ROCK	10		2-C	—	18	—	—	—	33/0.5' 20/0.0 HAMMER BOUNCES
	11.0' - 15.0' 45 MIN.	COBBLES OR BOULDER									
GM		DENSE, MOTTLED BROWN SILTY SAND & DECOMPOSED ROCK	15		2-D	—	21	—	—	—	30/0.3' HAMMER BOUNCES
			20		2-E	—	14	—	—	—	85
23.5'-25a'	21.5-23.5' 5 MIN.										
	10 MIN.		25		2-F	NO RECOVERY					30/0.0' HAMMER BOUNCES
	25.0'-30.0' 1½ HOUR	GRAY-BROWN ROCK (BOULDER?)									
			30		2-G	NO RECOVERY					30/0.0' HAMMER BOUNCES
		END OF BORING @ 32' 5-31-74									

*Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture, Dated 3-4-74

WAIANAE SUBD. HAWAIIAN HOMES

WALTER LUM ASSOCIATES, INC. [redacted] 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS _ UNIT I — HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Waianae, Oahu, Hawaii

Tax Map Key: 8-5-04: Por. 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2"ϕ - 2" O.D. THIN WALL TUBE; 2"SS - 2" STANDARD SPLIT SPOON

BORING NO. 3 Sheet No. _____ of _____
Driller: W. LUM ASSOC. INC. Date: JUNE 3 & 4, 1974
Field Party: KAKU, RADOVICH
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 135' ± * Datum: –
Drill Bit: T.C. DRAG

Water Level	NOT NOTICED				
Time	–				
Date	6-3-74				

Unified Soil Classification	DRILL RATE	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5'
		ELEV. = 135' ± *	0									
ML		MEDIUM, BROWN SANDY SILT W/TRACES OF ROOTS		2"SS	3-A	–	16	–	–	–	4/0 5'	14/0.5'
		DENSE, GRAY-BROWN GRAVEL W/TRACES OF BROWN, CLAYEY SILT & SAND	5	2"SS	3-B	–	16	–	–	–	30/0.5'	30/0.3'
		COBBLES OR BOULDERS										HAMMER BOUNCES
(SM)	7.5'-10.0' 30 MIN.	DENSE, MOTTLED BROWN SILTY SAND	10	2"SS	3-C	–	32 17	–	–	–		50/0.5'
(SM)	11.0'-15.0' 30 MIN.	DENSE, MOTTLED BROWN SILTY SAND W/GRAVEL & DECOMPOSED ROCK	15	2"SS	3-D	–	20 28	–	–	–		43
	16.5'-17.5' 5 MIN.	STIFF, BROWN CLAYEY SILT W/DECOMPOSED ROCK										
MH	17.5'-20.0' 30 MIN.	STIFF, MOTTLED BROWN CLAYEY SILT W/DECOMPOSED ROCK	20	2"SS	3-E	–	40 37	LL= 60 PL= 38	–	–		
(SM)	21.5'-22.5' 5 MIN.	MEDIUM DENSITY, BROWN SILTY SAND										
(SM)		MEDIUM DENSITY MOTTLED BROWN SILTY SAND W/DECOMPOSED ROCK & CLAY POCKETS	25	2"S	3-F	–	26	–	–	–		14/0.5'
	27.5'-30.0' 10 MIN.		30	2"SS	3-G	–	17	–	–	–		50/0.5'
	30.5'-35.0' 15 MIN.	DENSE, MOTTLED BROWN SILTY SAND W/DECOMPOSED ROCK	35	2"SS	3-H	–	16	–	–	–		30/0.1' HAMMER BOUNCES
	35.1'-40.0' 40 MIN.		40	2"SS	3-I	–	24 44	–	–	–		50
(MH)		STIFF, MOTTLED BROWN CLAYEY SILT W/SAND										
		END OF BORING @ 41.5' 6-4-74										

NOTE:
LL= LIQUID LIMIT
PL= PLASTIC LIMIT

*Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture, Dated 3-4-74

WAIANAE SUBD HAWN HOMES

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS - UNIT I
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: Por. 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 4 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: JUNE 5, 1974
Field Party: KAKU, RADOVICH
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 144'± * Datum: —
Drill Bit: T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	6-6-74				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 144'± *	0								
ML-CL	STIFF, BROWN CLAYEY SILT W/ SAND GRAVEL & TRACES OF ROOTS			4-A	-	15	— LL= 46 PL= 27	-	-	
	COBBLE OR BOULDER	5		4-B	ROCK FRAGMENTS					40%.1' HAMMER BOUNCES
	NOTE: DRILL TIME 40 MIN. AT 5'-6.5'. MOVE HOLE 3'± EAST.									
	END OF BORING @ 8' 6-5-74									

NOTE:
LL: LIQUID LIMIT
PL: PLASTIC LIMIT

* Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture Dated 3-4-74

WAIANAE HAW'N HOMES

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS - UNIT I
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: Por. 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 6 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date MAY 1 & 2, 1974
Field Party ASATO, KAKU, OMORI
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 188'± * Datum —
Drill Bit T.C. DRAG

Water Level	NOT NOTICED			
Time	—			
Date	5-2-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 188'± *	0								
ML-CL	STIFF, BROWN CLAYEY SILT W/TRACES OF ROOTS			G-A	–	19	– LL: 43 PL: 26	–	–	
(CH)	STIFF, DARK BROWN CLAY W/GRAY-BROWN DECOMPOSED ROCK			G-B	–	22	–	–	–	30/0.5'
	COBBLES OR BOULDERS	5		G-C	ROCK FRAGMENTS					30/0.1' HAMMER BOUNCES
					NOTE: MOVED NORTH			HOLE	10'±	
	DENSE, GRAY-BROWN SILTY SAND & SOME BLUE ROCK FRAGMENTS	10		G-D	–	9	–	–	–	40/0.1'
(SM)	DENSE, MOTTLED BROWN SILTY SAND & DECOMPOSED ROCK	15		G-E	–	17	–	–	–	71
	END OF BORING @ 16.5' 5-2-74				NOTE LL: LIQUID LIMIT PL: PLASTIC LIMIT					

*Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture Dated 3-4-74

WAIANAE HAWN thYES

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS - UNIT I
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: Por. 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 7 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: APR. 26 & 29, 1974
Field Party: KAKU, KAU, OMORI, ASATO
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 182'± * Datum: —
Drill Bit: T.C. DRAG

Water Level	NOT NOTICED	NOT NOTICED			
Time	—	—			
Date	4-26-74	4-29-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 182'± *	0								
OH	STIFF, BROWN CLAY W/ROOTS			7-A	—	24	— LL= 67 PL= 26	—	—	
(SM)	DENSE, MOTTLED BROWN SILTY SAND W/ DECOMPOSED ROCK			7-B	—	14	—	—	—	40/0.5' HAMMER BOUNCES
	REDDISH BROWN PUKA PUKA DECOMP ROCK	5		7-C	—	7	—	—	—	40/0.2'
(ML)	DENSE, MOTTLED BROWN CLAYEY SILT W/ DECOMPOSED ROCK	10		7-D	—	24	—	—	—	20/0.1' HAMMER BOUNCES
(ML)	STIFF, GRAY-BROWN CLAYEY SILT	15		7-E	—	23	—	—	—	40/0.3'
	END OF BORING @ 15.8' 4-28-74									

NOTE:
LL= LIQUID LIMIT
PL= PLASTIC LIMIT

*Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture Dated 3-4-74

WAIANAE HAW'N HOMES

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: WAIANAE RESIDENCE LOTS – UNIT I
HAWAIIAN HOME LANDS

LOCATION: Waianae Valley, Waianae, Oahu, Hawaii
Tax Map Key: 8-5-04: Por. 53

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 10 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: APR. 29, 1974
Field Party: ASATO, KAKU, OMORI
Type of Boring: AUGER (VERSA DRILL) Diam.: 4"
Elev.: 172'± * Datum: —
Drill Bit: T.C. DRAG

Water Level				
Time	—			
Date	4-29-74			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Wet Dens. P.C.F.	Water Cont. %	Dry Dens. P.C.F.	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 172'± *	0								
(MH-CH)	STIFF, BROWN SILTY CLAY W/TRACES OF ROOTS & GRAY DECOMPOSED ROCK			10-A	–	20	–	–	–	
				10-B	–	14	–	–	–	40/0.5' HAMMER BOUNCES
	COBBLE OR BOULDER				NOTE: 25 MIN. DRILL TIME 3.0'-4.0'±. MOVE 5' NORTH.					
(SM)	DENSE, BROWN SILTY SAND W/GRAVEL	5		10-C	–	10	–	–	–	40/0.2'
	COBBLES OR BOULDER				NOTE: SECOND ATTEMPT. 20 MIN. DRILL TIME 3.0'-4.0'± MOVED 5.0'± NORTH.					
		10		10-D	No	RECOVERY				50/0.2' HAMMER BOUNCES
(SM)	DENSE, MOTTLED BROWN SILTY SAND	15		10-E	–	22	–	–	–	50/0.4'
	END OF BORING @ 15.9' 4-29-74									

* Elev. Estimated from Preliminary Subd. Map by Kurio-Arakaki, Joint Venture Dated 3-4-74

PROJECT LOCATION SKETCH
NOT TO SCALE

PROJECT LIMITS

B-17 B-13 B-9 B-6 B-18 B-14 B-10 B-5 B-1 B-7 B-19 B-15 B-6 B-2 B-11 B-7 B-3 B-16 B-8 B-12 B-4

3% TO 5% ±

REDDISH-BROWN SILTY CLAY "ML-CL"
ON SURFACE 1± FT.
BELOW THAT "CH" CLAY TO ABOUT 5± FT. DEPTH

2% TO 5% ±

2% TO 5% ±

EXISTING DAIRY

RESERVOIR ?

DAIRY WASH WATER

RESERVOIR ?

DRAINAGE

OPEN PIT #23

OPEN PIT #22

OPEN PIT #21

OPEN PIT #20

5% ±

"CH" CLAY SOILS
TO ABOUT 2 TO 5± FT DEPTH

5% TO 10% ±

5% TO 10% ±

TOE OF THE RIDGE

APPROXIMATE PROJECT LIMITS

RIDGE LINE

EE RIDGE

LEGEND

- BORING FOR THIS PROJECT
- OPEN PIT FOR THIS PROJECT
- BORING FOR "WAIANAE RESIDENCE LOTS-UNIT 1" DATED JULY 5, 1974

BORING & OPEN PIT LOCATION SKETCH
WAIANAE RESIDENCE LOTS-UNIT 2
WAIANAE VALLEY, WAIANAE, OAHU, HAWAII
TAX MAP KEY: 8-5-04:12, POR 1 & 53

Dr. SHL	WALTER LUM ASSOCIATES, INC.	Sheet
Date 1/75	3030 WAIALAE AVE.	
Rev.	CIVIL ENGINEERS	of
	PHONE 737-7931	

PROJECT LIMITS

B-17 B-13 B-9

3% ± 5% ±

B-6

B-18

REDDISH-BROWN SILTY CLAY "ML-CL"
ON SURFACE 1± FT.
BELOW THAT "C H" CLAY TO ABOUT 5± FT. DEPTH

B-5

2% TO 5% ±

B-14 B-10

B-6

B-10

OPEN PIT #26

DRAINAGE WAY

B-7

2% TO 5% ±

RESERVOI

OPEN PIT #25

10% ±

B-19

B-15

DRAINAGE

B-7

B-11

OPEN PIT #27

5% ±

OPEN PIT #23

OPEN PIT #22

OPEN PIT #21

"CH" CLAY SOILS
TO ABOUT 2 TO 5± FT DEPTH

5% ±

OPEN PIT #24

10% TO 15% ±

OPEN PIT #20

B-16

5% TO 10% ±

5% TO 10% ±

B-8

B-12

TOE OF THE RIDGE

APPROXIMATE PROJECT LIMITS

RIDGE LINE

PAHEEHEE RIDGE

LEGEND

- BORING FOR THIS PROJECT
- OPEN PIT FOR THIS PROJECT
- BORING FOR "WAIANAE RESIDENCE LOTS UNIT I" DATED JULY 5, 1974

WAIANAE VALLEY ROAD

B-34

B-37

B-39

3% TO 5% ±

NORTH
SCALE: 1" = 160'

B-29

3% TO 5% ±

B-28

"CH" CLAY SOILS
TO ABOUT 2 TO 5 ± FT DEPTH

B-33

B-31

B-38

B-30

25% TO 50% ±

B-36

B-35

APPROXIMATE

B-32

B-2

B-3

B-4

STREAM

KAUPUNI

WAIANAE RESIDENCE LOTS UNIT 2
NORTHWESTERN SITE
(TMK 8-5-04: 12)

WAIANAE RESIDENCE LOTS UNIT 1

WAIANAE RESIDENCE LOTS UNIT-2
SOUTHEASTERN SITE

WAIANAE VALLEY ROAD

NORTH
SCALE: 1" = 160'

B-29
B-28
B-30
B-31
B-32
B-33
B-34
B-35
B-36
B-37
B-38
B-39
B-40
B-41
B-42
B-3
B-4

3% TO 5%±

25% TO 50%

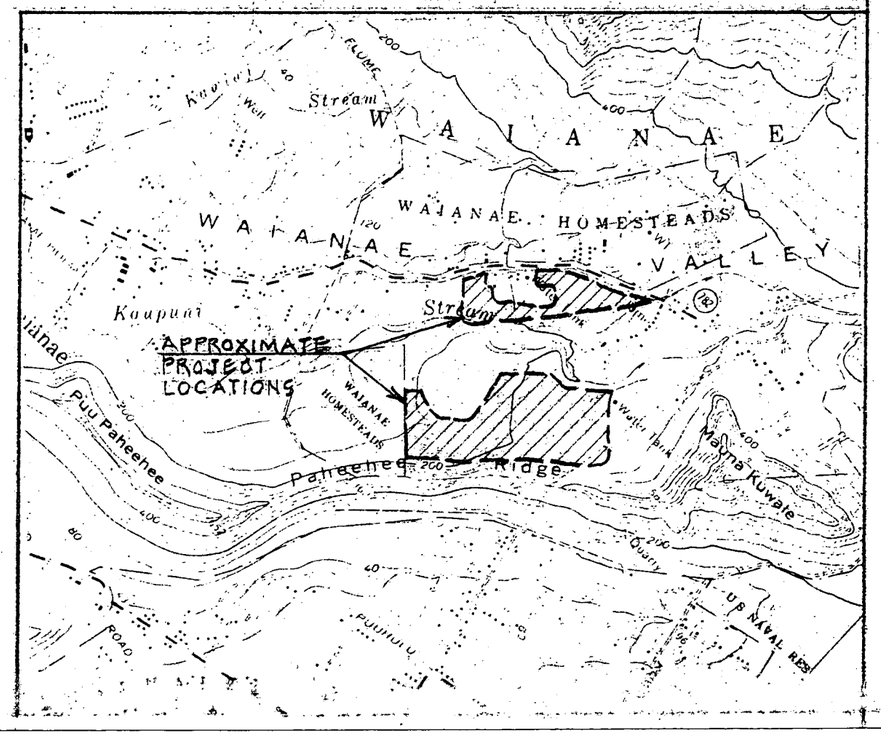
"CH" CLAY SOILS
TO ABOUT 2 TO 5 ± FT DEPTH

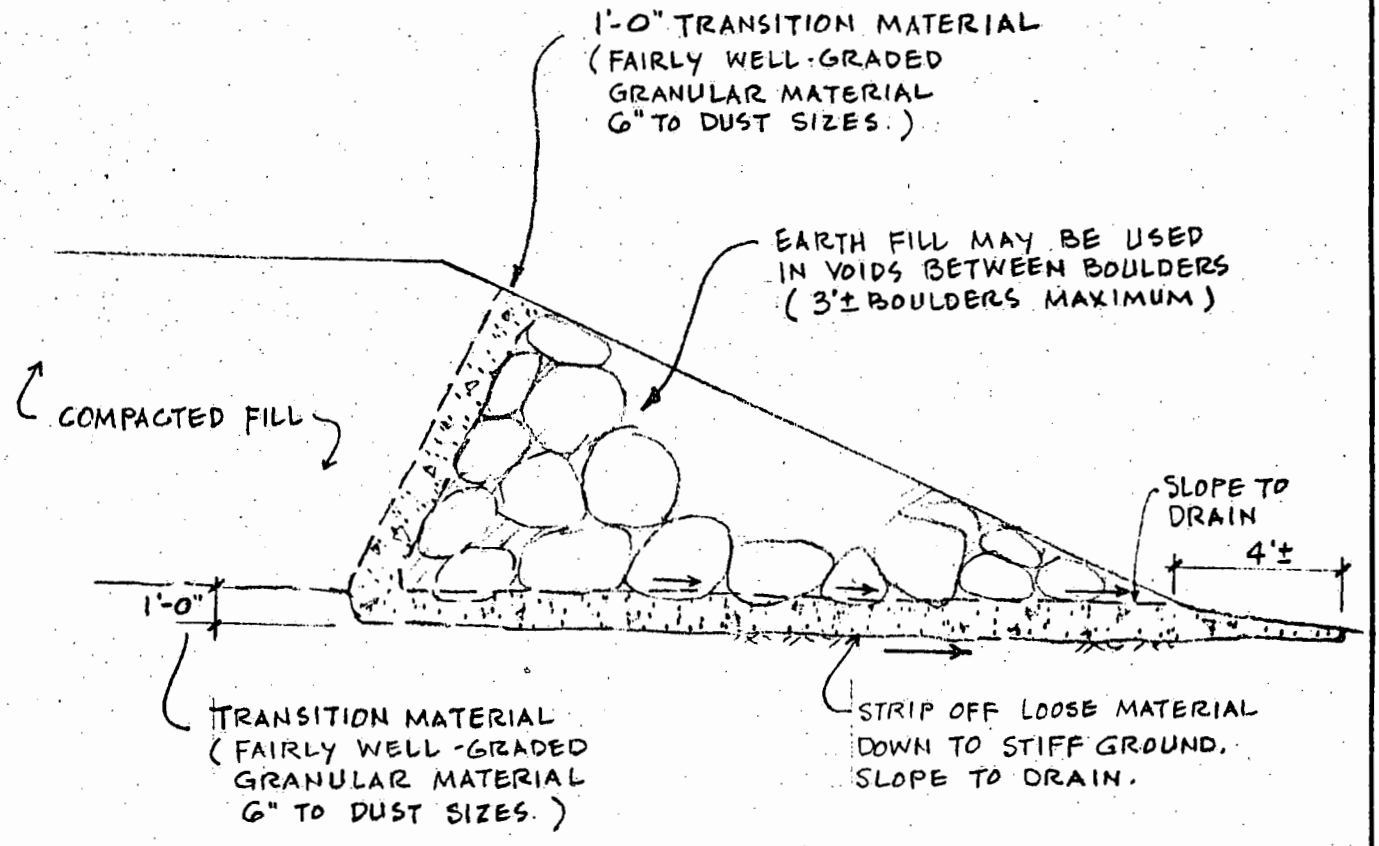
APPROXIMATE PROJECT LIMITS

WAIANAE RESIDENCE LOTS UNIT 2
NORTHWESTERN SITE
(TMK 8-5-04: 12)

ENCE LOTS UNIT 1

WAIANAE RESIDENCE LOTS UNIT-2
SOUTHEASTERN SITE





SCHEMATIC SECTION

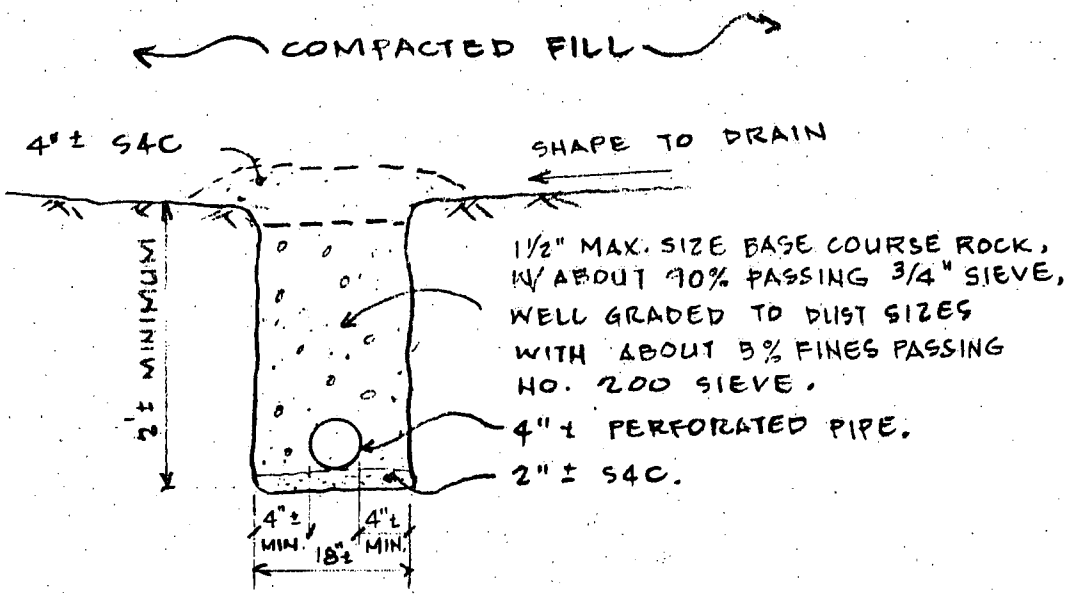
NOT TO SCALE

FIGURE 1

SCHEMATIC SECTION

WAIANAE RESIDENCE LOTS - UNIT 2
HAWAIIAN HOME LANDS
WAIANAE VALLEY, OAHU, HAWAII
TAX MAP KEY: 8-5-04:12, POR. 1 & 53

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS



TYPICAL SUBDRAIN LINE (WITH PERFORATED TUBING)

TYPICAL SUBDRAIN LATERAL (NO TUBING)

NOT TO SCALE

FIGURE 2

SUBDRAIN SKETCH

WAIANAE RESIDENCE LOTS - UNIT 2

WAIANAE, OAHU, HAWAII

TAX MAP KEY: 8-5-04: 12, Por. 1 & 53

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The boring logs indicate the approximate subsurface soil conditions encountered only at the drill holes where the borings were made at the times designated on the logs and may not represent conditions at other locations or at other dates. Soil conditions and water levels may change with the passage of time and construction methods or improvements at the site.

During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we should be advised immediately to review or reconsider our recommendations in light of the new developments.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse, changed conditions, and changes in the state of the art of soil engineering.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.